

## CITY OF AUSTIN AUSTIN WATER

# PROJECT MANUAL Contract Documents and Technical Specifications

# VOLUME 1 of 2 SPRINGDALE/290 WATER LINE IMPROVEMENTS

C.I.P. PROJECT NUMBER: 6935.022 SOLICITATION NUMBER: 6100 CLMC847

CITY OF AUSTIN
Public Works Department
PO Box 1088
Austin, TX 78767

April 19, 2021 (First Day of Ac

RUBÉN LÓPEZ, JR
93745
93745

The City of Austin is committed to compliance with the Americans with Disabilities Act.

Reasonable modifications and equal access to communications will be provided upon request

PROJECT MANUAL IFB NUMBER: 6100 CLMC847

**Sub Project: 6935.022** 

#### SPRINGDALE/290 WATER LINE IMPROVEMENTS

#### **Project Manager:**

Demira Wyatt
City of Austin
Public Works | Project Management Division
505 Barton Springs Road, Suite 900
Austin, Texas 78704
Phone: (512) 974-7213

Demira.Wyatt@austintexas.gov

#### **Engineer of Record:**

Rubén López, Jr., P.E. City of Austin Public Works | Engineering Services Division 505 Barton Springs Road, Suite 900 Austin, Texas 78704 Phone: (512) 974-7159

Ruben.Lopez@austintexas.gov

#### **Sponsoring Department:**

Austin Water 625 E. 10th Street Austin, Texas 78701

Joe Hoepken, P.E. Phone: (512) 972-1168

Joe.Hoepken@austintexas.gov

PROJECT MANUAL IFB NUMBER: 6100 CLMC847

**Sub Project: 6935.022** 

### SPRINGDALE/290 WATER LINE IMPROVEMENTS SEALS PAGE

BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT (SECTIONS 00020, 00100, 00220, 00300U, 00400, 00405, 00410, 00425A&B, 00440, 00475, 00500, 00610, 00620, 00630, 00631, 00632, 00650, 00670, 00680, 00681, 00700, 00810, 00830, 00830HH, 00900)

DIVISION 1 – GENERAL REQUIREMENTS (SECTIONS 01010, 01050, 01095, 01096, 01200, 01300, 01353, 01380, 01500, 01505, 01550, 01730, 01900, 01900a&b, 01901, 01902, 01904, 01910, 01911, 01915, 01917)

SPECIAL PROVISIONS TO CITY STANDARD TECHNICAL SPECIFICATIONS (SP510S, SP803S, SP1617, SP1901)

SPECIAL SPECIFICATIONS (SS0884, SS1025)

Rubén López, Jr., P.E.

**City of Austin** 

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RUBÉN LÓPEZ, JR ision 93745

BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT (SECTION 00220)

SPECIAL SPECIFICATIONS (SS2450)

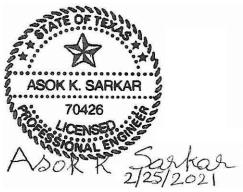
T. JASON ROBERTS
98233
98233
CENSED
3/1/2021

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Jason.Roberts@jacobs.com

**Sub Project: 6935.022** 

### SPRINGDALE/290 WATER LINE IMPROVEMENTS SEALS PAGE

DIVISION 16 – ELECTRICAL (SECTIONS S16010, S16011, S16130, S16140, S16150, S16191, S16200, S16205, S16500, S16550, S16610, S16700, S16730, S16950)

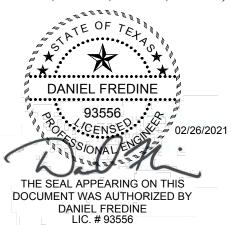


Asok K. Sarkar, P.E. City of Austin Austin Water | Facility Engineering Division 625 E. 10th Street Austin, Texas 78701

Phone: (512) 972-0259

Asok.Sarkar@austintexas.gov

DIVISION 17 – PROCESS INSTRUMENTATION AND CONTROLS SYSTEM (SECTIONS S17000, S17320, S17410, S17420, S17500, S17900)



Dan Fredine, P.E. City of Austin Austin Water | Facility Engineering Division 625 E. 10th Street Austin, Texas 78701 Phone: (512) 972-0281

Dan.Fredine@austintexas.gov

Document	Date	Title
Number		

**VOLUME 1**03/26/2021 Table of Contents

#### **BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT**

00020 00100 00220 00300U	04/03/2020 04/03/2020 03/30/18 04/03/2020	Invitation for Bids Instructions to Bidders Geotechnical Data Bid Form-Unit Price
003000	04/03/2020	Total Bid Form
00400	04/30/19	Statement of Bidder's Experience
00405	03/30/18	Certificate of Non-Suspension or Debarment
00410	09/17/18	Statement of Bidder's Safety Experience
00440	10/22/19	Prohibited Activities ,
00475	08/12/19	Nonresident Bidder Provisions
00500	02/04/2020	Agreement (SAMPLE)
00610	02/04/2020	Performance Bond
00620	02/04/2020	Payment Bond
00630	10/22/19	Non-Discrimination and Non-Retaliation Certificate
00631	03/30/18	Title VI Assurances Appendix A
00632	03/30/18	Title VI Assurances Appendix E
00650	06/08/18	Certificate of Insurance
00670	01/11/19	Sales Tax Exemption Certificate
00680	03/30/18	Non-Use of Asbestos Affidavit (Prior to Construction)
00681	03/30/18	Non-Use of Asbestos Affidavit (After Construction)
00700	12/04/2020	General Conditions
00810	12/04/2020	Supplemental General Conditions
00830	02/04/2020	Wage Rates and Payroll Reporting
00830HH	01/11/2021	Wage Rates Highway Heavy
00840	12/04/2020	Construction Training Program Requirements
00900	01/11/19	Addendum (SAMPLE)

#### **SPECIFICATIONS**

#### **Division 1 - General Requirements**

01010 01020 01050 01095 01096 01200 01300 01353 01380 01500 01505 01550	08/28/2020 03/30/18 10/19/15 07/21/03 05/06/11 08/09/12 01/11/19 04/29/2020 08/09/12 08/28/2020 08/12/19 08/09/12 04/30/14 03/12/12	Summary of Work Allowances Grades Lines & Levels Reference Standards and Definitions Stormwater Pollution Prevention Plan (SWPPP) Project Meetings Submittals Construction Equipment Emissions Reduction Plan Construction Photography & Videos Temporary Facilities Construction and Demolition Waste Management Public Safety and Convenience Operation and Maintenance Data Prohibition of Asbestos Containing Materials
01900a	06/05/06	Statement of Non-Inclusion of Asbestos Containing Material (E/A Prior to Design)

#### **Table of Contents**

01900b	06/05/06	Statement of Non-Inclusion of Asbestos Containing Material (E/A After Design)
01901	08/29/18	Scope of Work – Asbestos Abatement
01902	08/29/18	Project Coordination - Asbestos Abatement
01904	08/29/18	Codes and Regulations - Asbestos Abatement
01910	08/29/18	Worker Protection - Asbestos Abatement
01911	08/29/18	Respiratory Protection - Asbestos Abatement
01915	08/29/18	Work Area Clearance - Asbestos Abatement
01917	08/29/18	Disposal of Asbestos Containing Waste Materials

#### **City Standard Technical Specifications**

<b>Series</b>	100 -	<b>Earthwork</b>
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104S 09/26/12 Removing Portland Cement Concrete

#### **Series 300 - Street Surface Courses**

315S	09/26/12	Milling Asphaltic Concrete Pavement and Non-P.C. Concrete Bases
340S	09/26/12	Hot Mix Asphaltic Concrete Pavement

#### **Series 400 – Concrete Structures and Miscellaneous Concrete**

402S	11/13/07	Controlled Low Strength Material
430S	11/15/11	P.C. Concrete Curb and Gutter
432S	01/04/10	P.C. Concrete Sidewalks
433S	12/09/08	P.C. Concrete Driveways
434S	11/13/07	P.C. Concrete Medians and Islands

#### **Series 500 – Pipe and Appurtenances**

504S	02/24/10	Adjusting Structures
505S	02/24/10	Concrete Encasement and Encasement Pipe
509S	09/26/12	Excavation Safety Systems
510	12/08/18	Pipe
511S	09/26/12	Water Valves

#### **Series 600 – Environmental**

602S	06/16/08	Sodding for Erosion Control
605S	06/21/07	Soil Retention Blanket
609S	01/04/16	Native Seeding and Planting for Restoration
610S	12/07/18	Preservation of Trees and Other Vegetation
628S	12/31/13	Sediment Containment Dike
641S	06/21/07	Stabilized Construction Entrance
642S	09/01/11	Silt Fence
648S	08/18/10	Mulch Sock

#### **Series 700 - Incidental Construction**

700S	09/26/12	Mobilization
701S	09/26/12	Fencing

#### **Series 800 – Urban Transportation** 802S 09/26/12 Project Signs

0025	09/20/12	Project Signs
803S	11/15/11	Barricades, Signs and Traffic Handling
862S	05/05/03	Temporary Removable Pavement Markings
863S	09/26/12	Reflectorized Pavement Markers
871S	06/21/07	Reflectorized Pavement Markings
874S	04/03/09	Eliminating Existing Pavement Markings and Markers

#### **Special Provisions to City Standard Technical Specifications**

SP510 SP641S SP803S SP862S SP1617	08/01/18 08/01/18 08/01/18 08/01/18	Pipe Stabilized Construction Entrance Barricades, Sign and Traffic Handling Temporary Removable Pavement Markings Potable Water Pressure Point Station #31
SP1617	08/01/18	Potable Water Pressure Point Station #31
SP1901	08/01/18	Scope of Work – Asbestos Abatement

#### **Special Specifications**

SS0884	08/01/18	Speed Cushions
SS1025	08/01/18	Private Lateral Relocation
SS2450	07/23/18	Horizontal Directional Drilling

#### **Division 16 - Electrical**

S16010	08/22/16	Electrical General Provisions
S16011	09/30/15	Identifications
S16130	10/05/16	Boxes and Cabinets
S16140	10/05/16	Wiring Devices
S16150	10/05/16	Raceways, Fittings, and Supports
S16191	10/24/16	Miscellaneous Equipment
S16200	10/20/16	Wiring, Conductors and Cable – 600V and Below
S16205	09/30/15	Wiring and Cable Tagging
S16500	08/22/16	Panelboards
S16550	08/22/16	Grounding
S16610	02/02/12	Lightning Protection
S16700	02/02/12	Common Control Panel Requirements for Equipment
S16730	10/05/16	Uninterruptible Power
S16950	09/30/15	Calibration and Testing

#### **Division 17 - Process Instrumentation and Controls System**

S17000 S17320	08/13/12 08/13/12	General Control System Requirements MAS Radio Subsystem
S17410 S17420 S17500 S17900	08/13/12 08/13/12 08/13/12 08/13/12	Panels and Enclosures Remote Terminal Unit Requirements Instrumentation and Control Equipment Instrument List

#### **VOL. 2 of 2** 08/2019 **MBE/WBE Procurement Program Package**

#### **END**

#### 1. OVERVIEW AND PROJECT INFORMATION

Following is a summary of information for this Project. Bidder is cautioned to refer to other sections of the Project Manual, Drawings and Addenda (Bid Documents) for further details.

The City of Austin, hereafter called OWNER, is requesting Bids for furnishing all labor, materials, equipment, supervision, and incidentals, and for performing all Work required for the following:

Project:	Springdale/290 Water Line Improvements
Located at:	Springdale Road and US 290 Frontage Road area
CIP ID No.:	6935.022
Solicitation No.:	6100 CLMC847

The Work consists of installing two (2) pressure reducing valve (PRV) stations to reduce the pressure in the Chimney Hill and Walnut Trace subdivision, one (1) remote terminal unit (RTU) and antenna, approximately 374 linear feet of 6" PVC, 7683 linear feet of 8" PVC, 583 linear feet of 12" PVC, 3952 linear feet of 16" PVC, 777 linear feet of 12" HDPE, 2566 linear feet of 20" HDPE water mains, and appurtenances. The Work also includes traffic control, erosion and sedimentation controls, and repair of all disturbed surfaces (pavement, sidewalks, curb and gutter, etc.)

#### 2. **BID DOCUMENTS**

Bid Documents are obtained through the City's Vendor Connection website, log on <a href="https://www.austintexas.gov/financeonline/vendor connection/index.cfm">www.austintexas.gov/financeonline/vendor connection/index.cfm</a>. A complete set of Bid Documents, including all sections of the Project Manual and Drawings, are included in the attachments section of each solicitation.

All addenda and answers to Bidders' questions will also be posted in the attachments section for each solicitation on the City's Vendor Connection website.

#### 3. **SUBMISSION OF BIDS**

Sealed Bids may be submitted to the Capital Contracting Office Bid Opening Desk located at One Texas Center, 505 Barton Springs Rd., Suite 1045-B, Austin, Texas 78704, or may be submitted electronically (see <a href="eResponse">eResponse</a>, Attachment 1 -Submitting Bids in Austin Finance Online).

Sealed Bid may be mailed using address below:

Address for US Mail (If mailed to the physical address, the proposal will be returned unopened)	
City of Austin	
Capital Contracting Office	
P. O. Box 1088	
Austin, Texas 78767-8845	

NOTE: Bids must either be received and time stamped in the Capital Contracting Office prior to the Due Date and Time or submitted electronically via Austin

Finance Online. The time of record for those electronically submitted is the time received in Austin Finance OnLine. It is the responsibility of the Offeror to ensure that their Bid arrives at the reception desk in the Capital Contracting Office or electronically prior to the time and date indicated. Arrival at the City's mailroom, mail terminal, or post office box will not constitute the Proposal arriving on time.

#### **Public Bid Opening Update**

Due to the unprecedented event of COVID-19 and to help prevent the further spread, Capital Contracting Office will NOT be conducting an in person bid opening. Bidders must either submit their bids and compliance plans no earlier than 10:00 AM and prior to 2:00 PM on the date bids are due to One Texas Center, 505 Barton Springs Rd., Suite 1045-B, Austin, Texas 78704; or must submit Bids and Compliance Plans electronically via Austin Finance Online prior to 2:00 PM on the day proposals are due. Bids and compliance plans submitted after 2:00 PM on the date bids are due will not be accepted. The Capital Contracting Office will open both the sealed bids and bids received electronically via Austin Finance Online at 3:00 PM on the date bids are due.

Bidders may watch the bid opening online using the following Web link: CCO Web Bid Opening Click Here

Disclaimer: The result of the bid opening does not become final until all bids are verified, and the bid tab is certified. The pencil bid tab and certified bid tab will be posted in Austin Finance Online at the following link:

https://www.austintexas.gov/financeonline/account services/solicitation/solicitations.cfm

ALL BIDS AND COMPLIANCE PLANS ARE DUE PRIOR TO (Austin time) 2:00 PM on 05/27/2021. BIDS WILL BE OPENED AT (Austin time) 3:00 PM on 05/27/2021.

ALL BIDS AND COMPLIANCE PLANS NOT RECEIVED PRIOR TO THE DATE AND TIME SET FORTH ABOVE WILL NOT BE ACCEPTED FOR CONSIDERATION. The time stamp clock in SUITE 1045B is the time of record and is verified with www.time.gov, the official U.S. time. For Bids submitted electronically via Austin Finance Online, the time of record is the time received in Austin Finance Online.

#### 4. **VENDOR REGISTRATION AND NON-DISCRIMINATION**

Prime Contractors must be registered with the OWNER prior to submitting a Bid electronically via Austin Finance Online. All CONTRACTORS must be registered to do business with OWNER prior to the Contract Award. All Subcontractors must be registered with the OWNER prior to execution of a contract. Prime Contractors are responsible for ensuring that their Subcontractors are registered as vendors with the City of Austin. Registration can be done through the OWNER's on-line Vendor Registration system. Log and follow directions: https://www.austintexas.gov/financeonline/account services/account/login.cfm

The City of Austin, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

#### 5. MBE/WBE PROCUREMENT PROGRAM

All City procurements are subject to the City's Minority-Owned and Women-Owned Business Enterprise Procurement Program found at Chapter 2-9-A of the City Code, as amended. The Program provides Minority-Owned and Women-Owned Business Enterprises (MBEs/WBEs) or Disadvantaged Business Enterprises (DBEs) full opportunity to participate in all City contracts. Goals for MBE/WBE or DBE participation are stated for each solicitation. Information on achieving the goals or documenting good faith efforts to achieve the goals are contained in the MBE/WBE Procurement Program Package or DBE Procurement Program Package attached to the solicitation. When goals are established, Bidders are required to complete and return the MBE/WBE or DBE Compliance Plan with their Bid. If a Compliance Plan is not submitted prior to the date and time set forth in the solicitation, the Bid will not be accepted for consideration. (See Section 00820 for MBE/WBE requirements on "no goal" solicitations.)

#### 6. **BID GUARANTY**

All Bids shall be accompanied by an acceptable Bid guaranty in an amount of not less than five percent (5%) of the total Bid, as specified in Section 00100, Instructions to Bidders.

#### 7. BONDS AND INSURANCE

Performance and payment bonds when required shall be executed on forms furnished by OWNER. Each bond shall be issued in an amount of one hundred percent (100%) of the Contract Amount by a solvent corporate surety company authorized to do business in the State of Texas, and shall meet any other requirements established by law or by OWNER pursuant to applicable law.

Minimum insurance requirements are specified in Section 00810, Supplemental General Conditions.

#### 8. WAGE COMPLIANCE

Minimum wage rates have been established and are specified in Section 00830, Wage Rates and Payroll Reporting.

#### 9. CONTRACT TIME

Contract Time is of the essence and all Work shall be substantially completed within **five hundred forty (540) Calendar** Days after date specified in the Notice to Proceed, in accordance with the Bid Form, Section 00300.

Final completion shall be achieved within **thirty (30) Calendar** Days after substantial completion.

Liquidated damages are **one thousand five hundred seventy (\$1570)** per **Calendar** Day for failure to substantially complete the work and **three hundred ten (\$310)** per **Calendar** Day for failure to achieve final completion within **thirty (30) Calendar** Days after substantial completion, in accordance with the Bid Form, Section 00300.

#### 10. OWNER'S RIGHTS

OWNER reserves the right to reject any or all Bids and to waive any minor informality in any Bid or solicitation procedure (a minor informality is one that does not affect the competitiveness of the Bid).

#### 11. PRE-BID CONFERENCE

A **non-mandatory** Pre-Bid Conference will be held on **04/29/2021**, **10:00 AM** (Austin time), via webinar and teleconference. Bidders may participate in the virtual pre-bid conference by clicking this link: <a href="CLMC847-Springdale/290">CLMC847-Springdale/290</a> or by calling **+1 512-831-7858** United States, Austin (Toll), Conference ID: **575 519 574#** For those calling in, please send an email to <a href="Adriana.Ybarra2@austintexas.gov">Adriana.Ybarra2@austintexas.gov</a> with the subject line **IFB 6100 CLMC847**, indicate in the body of the email your name, the firm you are representing, your contact information and whether you are a prime firm or subcontractor. Please send this by **5:00 pm** on the day of the virtual pre-bid meeting.

Attendance is not mandatory unless otherwise stated. Bidders must attend any mandatory Pre-Bid Conference and are encouraged to attend any non-mandatory Pre-Bid Conference to ensure their understanding of OWNER's bidding and contracting requirements, particularly MBE/WBE or DBE Procurement Program requirements. **Bidder must virtually arrive and sign-in via Microsoft Forms** by either using the QR code which will be displayed on the introduction slide or by clicking on the provided link that will be posted into the live stream question and answer field. If you have trouble accessing the link or QR code please send an email to **Adriana.Ybarra2@austintexas.gov** providing the following information: Your name, email address, the firm you are representing, whether you are a prime firm or subcontractor, and also indicate if your firm is a MBE/WBE or DBE. If the Pre-Bid Conference is mandatory, Bidders must sign into the meeting using one of the methods above within fifteen (15) minutes of the scheduled start time of the meeting, otherwise the Bidder will not be allowed to submit a Bid for the project.

#### 12. ANTI-LOBBYING AND PROCUREMENT

On June 14, 2018, the Austin City Council adopted Ordinance No. 20180614-056 replacing Chapter 2.7, Article 6 of the City Code relating to Anti-Lobbying and Procurement. The policy defined in this Code applies to Solicitations for goods and/or services requiring City Council approval under City Charter Article VII, Section 15 (Purchase Procedures). The City requires Offerors submitting Offers on this Solicitation to certify that the Offeror has not in any way directly or indirectly had communication restricted in the ordinance section 2-7-104 during the No-Lobbying Period as defined in the Ordinance. The text of the City Ordinance is posted on the Internet at:

https://assets.austintexas.gov/purchase/downloads/New\_ALO\_Ordinance\_No\_20180614-056.pdf

#### 13. AUTHORIZED CONTACT PERSONS

The persons listed below may be contacted for information regarding the Invitation for Bid.

PROJECT MANAGER: Demira Wyatt

Telephone: (512) 974-7213

Email: <u>Demira.Wyatt@austintexas.gov</u>

#### **Bidding Requirements, Contract Forms and Conditions of the Contract**

CAPITAL CONTRACTING OFFICE CONTACT: Adriana Ybarra

Telephone: **(512) 978-1507** 

Email: Adriana.Ybarra2@austintexas.gov

SMALL & MINORITY BUSINESS RESOURCES DEPARTMENT CONTACT: Cassidy Villegan

Telephone: **(512) 974-9113** 

Email: <u>Cassidy.Villegan@austintexas.gov</u>

**END** 

#### **INSTRUCTIONS TO BIDDERS**

Section 00100

#### 1. PREPARATION OF BID

- **1.1 Bid Documents.** Each Bidder must prepare its Bid on forms furnished by OWNER or as otherwise specified or permitted. Blank spaces for each item in Bid form must be filled. Bidder must submit a price for each item in Bid. In case of conflict between unit prices and extensions, unit prices shall govern. The Bid must be executed in the complete and correct legal name of individual, partnership, firm, corporation or other legal entity constituting the Bidder.
- **1.2 Vendor Registration.** Prime Contractors must be registered with the OWNER prior to submitting a Bid electronically via Austin Finance Online. All CONTRACTORS must be registered to do business with OWNER prior to Contract Award. All Subcontractors must be registered with the OWNER prior to execution of a contract. Prime Contractors are responsible for ensuring that their Subcontractors are registered as vendors with the City of Austin. Registration can be done through the OWNER's on-line Vendor Registration system. Log onto <a href="https://www.austintexas.gov/financeonline/account\_services/account/login.cfm">https://www.austintexas.gov/financeonline/account\_services/account/login.cfm</a> and follow the directions.
- **1.3 Pre-Bid Conference.** Unless otherwise notified, Bidders must attend the Pre-Bid Conference to ensure their understanding of OWNER's bidding and contracting requirements, particularly MBE/WBE Procurement Program requirements.
- **1.4 Sales Tax Exemption.** The Owner is a tax-exempt organization as defined by Chapter 11 of the Property Tax Code of Texas. Bid prices shall not include sales tax on materials, supplies, or equipment that are incorporated into the real property interest of the OWNER or are otherwise completely used and consumed in the performance of the Contract. OWNER will furnish CONTRACTOR with a Sales Tax Exemption Certificate to be issued to Suppliers in lieu of the tax.
- **1.5 Minimum Wages.** Workers on Project shall be paid not less than wage rates, including fringe benefits, as published by the Department of Labor (DOL) for Building Construction and Heavy and Highway Trades "AS APPLICABLE" and/or the minimum wage required by City of Austin Ordinance No. 20160324-015, whichever is higher. The Total Minimum Wage required can be met using any combination of cash and non-cash qualified fringe benefits provided the cash component meets or exceeds the minimum wage required.
- **1.6 Addenda.** Bidder shall be knowledgeable of all Addenda issued and shall acknowledge all Addenda in spaces provided on Bid form. Further information regarding the Bid documents and the Project may be obtained from the Project Manager listed at the end of Section 00020, Invitation for Bids.
- **1.7 Required Items.** Bids must include all specified items in this section and be submitted in accordance with paragraph No. 7 below. Any additional requirement to the bid submittal is specified in Section 00820. Any corrections to a Bid shall be initialed by the person signing the Bid.
- **1.8 Professional Services.** Bidders must secure any required professional services that are defined as professional services under the Professional Services Procurement Act, Chapter 2254 of the Texas Government Code (for example: registered professional land surveyors and professional engineers) using the qualifications based selection process

prescribed by that chapter. (Note: It is a violation of State Law to solicit Bids for professional services.)

- **1.9 Further Information.** Prospective Bidders desiring further information or interpretation of Project Manual or Drawings must make a written request for such information to OWNER addressed to the Authorized Contact Person listed in Section 00020 no later than seven (7) Working Days before Bid opening. Interpretation of Project Manual or Drawings will be made by Addendum only and obtained through the City's Vendor Connection website. Log on to: <a href="https://www.austintexas.gov/financeonline/vendor connection/index.cfm">www.austintexas.gov/financeonline/vendor connection/index.cfm</a>. Any verbal communications will not be binding on the OWNER.
- **1.10** Anti-Lobbying and Procurement. Article 6, Chapter 2-7, City Code, repealed and replaced effective on June 25, 2018, prohibits lobbying activities or representations by Offerors during the No Lobbying Period as defined in the Ordinance.

#### 1.10.1. FINDINGS; PURPOSE.

- (A) The council finds that persons who enter a competitive process for a city contract voluntarily agree to abide by the terms of the competitive process, including the provisions of this article.
- (B) The council finds that it is in the City's interest:
  - (i) to provide the most fair, equitable, and competitive process possible for selection among potential vendors in order to acquire the best and most competitive goods and services; and
  - (ii) to further compliance with State law procurement requirements.
- (C) The council intends that:
  - (i) each response is considered on the same basis as all others; and
  - (ii) respondents have equal access to information regarding a solicitation, and the same opportunity to present information regarding the solicitation for consideration by the City.

#### 1.10.2. APPLICABILITY.

- (A) This article applies to all solicitations except:
  - (i) City social service funding;
  - (ii) City cultural arts funding;
  - (iii) federal, state or City block grant funding;
  - (iv) the sale or rental of real property;
  - (v) interlocal contracts or agreements; and
  - (vi) solicitations specifically exempted from this article by council.
- (B) Absent an affirmative determination by the council, the purchasing officer has the discretion to apply this article to any other competitive process.
- (C) City Code Section 1-1-99 (*Offenses; General Penalty*) does not apply to this article.

#### 1.10.3. DEFINITIONS.

In this article:

- (A) AGENT means a person authorized by a respondent to act for or in place of the respondent in order to communicate on behalf of that respondent. Each of the following is presumed to be an agent:
  - (i) a current full-time or part-time employee, owner, director, officer, member, or manager of a respondent;

#### **Bidding Requirements, Contract Forms and Conditions of the Contract**

- (ii) a person related within the first degree of consanguinity or affinity to a current fulltime or part-time employee, owner, director, officer, member, or manager of a respondent;
- (iii) a person related within the first degree of consanguinity or affinity to the respondent, if a respondent is an individual person; and Section 0200 V2, Solicitation Instructions 4 Rev. 06-26-2018
- (iv) a lobbyist, attorney, or other legal representative of the respondent that has been retained by the respondent with respect to the subject matter of either the solicitation or the respondent's response to the solicitation.
- (B) AUTHORIZED CONTACT PERSON means a City employee designated in a City solicitation as the point of contact for all purposes for that solicitation.
- (C) CITY EMPLOYEE is defined in Section 2-7-2 (*Definitions*), and further includes an independent contractor hired by the City with respect to the solicitation.
- (D) CITY OFFICIAL is defined in Section 2-7-2 (Definitions).
- (E) NO-LOBBYING PERIOD means the period of time beginning at the date and time a solicitation is published and continuing through the earliest of the following:
  - (i) the date the last contract resulting from the solicitation is signed;
  - (ii) 60 days following council authorization of the last contract resulting from the solicitation; or
  - (iii) cancellation of the solicitation by the City
- (F) PURCHASING OFFICER means the City employee authorized to carry out the purchasing and procurement functions and authority of the City.
- (G) RESPONSE means a written offer or submission in reply to a solicitation.
- (H) RESPONDENT means a person or entity that has timely submitted or subsequently timely submits a response to a City solicitation, even if that person subsequently withdraws its response or has been disqualified by the City for any reason. Respondent includes:
  - (i) a subsidiary or parent of a respondent;
  - (ii) a joint enterprise, joint venture, or partnership with an interest in a response and in which a respondent is a member or is otherwise involved, including any partner in such joint enterprise, joint venture, or partnership; and
  - (iii) a subcontractor to a respondent in connection with that respondent's response.
- (I) SOLICITATION means an opportunity to compete to conduct business with the City that requires council approval under City Charter Article VII Section 15 (*Purchase Procedure*), and includes, without limitation:
  - (i) an invitation for bids;
  - (ii) a request for proposals;
  - (iii) a request for qualifications;
  - (iv) a notice of funding availability; and
  - (v) any other competitive solicitation process for which the purchasing officer, in the purchasing officer's sole discretion, affirmatively determines this article should apply in accordance with Section 2-B.

#### 1.10.4. RESTRICTION ON LOBBYING.

Subject to the exclusions in Section 5 (*Permitted Communications*), during a no-lobbying period,

- (A) a respondent or an agent shall not communicate directly with a City official or a City employee, or both in order to:
  - (i) provide substantive information about any respondent or response with respect to the solicitation to which the communication relates;
  - (ii) encourage the City to reject one or more of the responses to the solicitation to which the communication relates;
  - (iii) convey a complaint about the solicitation to which the communication relates; or
  - (iv) ask any City official or City employee to favor or oppose, recommend or not recommend, vote for or against, consider or not consider, or take action or refrain from taking action on any vote, decision, or agenda item regarding the solicitation to which the communication relates.
- (B) a City official shall not contact or communicate with a respondent regarding a response or the solicitation to which the no-lobbying period applies;
- (C) a City employee, other than the authorized contact person, shall not contact or communicate with a respondent regarding a response or the solicitation to which the no-lobbying period applies.

#### 1.10.5. PERMITTED COMMUNICATIONS.

- The following communications are permitted under this article at any time:
- (A) any communication between a respondent or agent and any authorized contact person, including, without limitation and in accordance with regulation, any complaint concerning the solicitation;
- (B) any communication between a respondent or agent and any person to the extent the communication relates solely to an existing contract between a respondent and the City, even when the scope, products, or services of the current contract are the same or similar to those contained in an active solicitation;
- (C) any communication between a respondent or an agent and a City employee to the extent the communication relates solely to a non-substantive, procedural matter related to a response or solicitation;
- (D) any communication required by or made during the course of a formal protest hearing related to a solicitation;
- (E) any communication between a respondent or an agent and the City's Small & Minority Business Resources Department, that solely relates to compliance with Chapters 2-9A through 2-9D (*Minority-Owned and Women-Owned Business Enterprise Procurement Program*) of the City Code;
- (F) any communication between an attorney representing a respondent and an attorney authorized to represent the City, to the extent the communication is permitted by the Texas Disciplinary Rules of Professional Conduct;
- (G) any communication made by a respondent or an agent to the applicable governing body during the course of a meeting properly noticed and held under Texas Government Code Chapter 551 (*Open Meetings Act*);
- (H) any communication between a respondent or an agent and a City employee whose official responsibility encompasses the setting of minimum insurance requirements for the solicitation to which the communication relates, to the extent the communication relates solely to the insurance requirements established by the City in the solicitation; and
- (I) any contribution or expenditure as defined in Chapter 2-2 (*Campaign Finance*).

#### 1.10.6. MODIFICATION OF RESTRICTION.

The purchasing officer may waive, modify, or reduce the requirements in Section 4 (*Restrictions on Lobbying*) in order to allow respondents to communicate with a City employee or a City official other than the authorized contact person when the purchasing officer determines, in writing, that the solicitation must be conducted in an expedited manner, including but not limited to a solicitation conducted for reasons of health or safety under the shortest schedule possible with no extensions. Any such modification authorized by the purchasing officer shall be stated in the solicitation.

#### 1.10.7. NOTICE.

- (A) Each solicitation shall include a notice advising respondents and prospective respondents:
  - (i) of the requirements of this article;
  - (ii) that any communication initiated by a City employee or City official, other than the authorized contact person, during the nolobbying period regarding a response or the solicitation may result in a violation of Section 4(A) if the respondent subsequently lobbies that City employee or City official.
- (B) The purchasing officer, or a City employee designated by the purchasing officer, shall provide weekly written notice, accessible to all City employees and City officials, of each solicitation for which the no-lobbying period is in effect.

#### 1.10.8. DISCLOSURE OF VIOLATION.

A City official or a City employee other than the authorized contact person that becomes aware of a violation of Section 4 (*Restrictions on Lobbying*) shall notify the authorized contact person in writing as soon as practicable.

#### 1.10.9. ENFORCEMENT.

- (A) A respondent that has been disqualified pursuant to Section 10(A) (*Disqualification; Contract Voidable*) may appeal such disqualification to a subcommittee that is less than a quorum of the Ethics Review Commission established in Chapter 2-7, Article 2 (*Ethics Review Commission*), whose decision on appeal shall be final and binding. Any appeal must be filed in the manner prescribed by the Ethics Review Commission within 5 calendar days of the notice given by the purchasing officer pursuant to Section 10(B).
- (B) The purchasing officer shall waive a violation of Section 4(A) if the violation was solely the result of communications initiated by a City official or a City employee other than the authorized contact person.
- (C) The purchasing officer has the authority to enforce this article through rules promulgated in accordance with Chapter 1-2 (*Adoption of Rules*), which at a minimum shall include a notice and protest process for respondents disqualified pursuant to Section 10 (*Disqualification; Contract Voidable*), including:
  - (1) written notice of the disqualification imposed pursuant to Section
  - 10 (Disqualification; Contract Voidable);
  - (2) written notice of the right to protest the disqualification imposed; and
  - (3) written notice of the right to request an impartial hearing process.

#### 1.10.10. DISQUALIFICATION; CONTRACT VOIDABLE.

- (A) If the purchasing officer finds that a respondent has violated Section 2-7-104(1), the respondent is disqualified from participating in the solicitation to which the violation related.
- (B) The purchasing officer shall promptly provide written notice of disqualification to a disqualified respondent.
- (C) If a respondent is disqualified from participating in a solicitation as a result of violating Section 2-7-104(1) and the solicitation is cancelled for any reason, that respondent is also disqualified from submitting a response to any reissue of the same or similar solicitation for the same or similar project. For the purposes of this section, the purchasing officer may determine whether any particular solicitation constitutes a "same or similar solicitation for the same or similar project".
- (D) If a respondent violates Section 104(1) and is awarded a contract resulting from the solicitation to which the violation relates, the City may void that contract.
- (E) Respondents that violate Section 2-7-104(1) three or more times during a five year period may be subject to debarment from participating in any new contracts with the City for a period of up to three years.
- **1.11** City's Minority-Owned and Women-Owned Business Enterprise / Disadvantaged Business Enterprise (MBE/WBE or DBE) Program Requirements. Good Faith Efforts. When a bidder cannot achieve the MBE/WBE or DBE goals or subgoals established for the project, the bidder must document its Good Faith Efforts to meet the goals or subgoals. Good Faith Effort evaluations will consider, at a minimum, the bidder's efforts to do the following:
- **1.11.1** Soliciting through at least two reasonable, available and verifiable means MBEs/WBEs within the Significant Local Business Presence boundaries at least seven (7) business days prior to the bid opening date to allow the MBEs/WBEs or DBEs to respond to the bid.
- **1.11.2** Providing interested MBEs/WBEs or DBEs adequate information about the bid documents and requirements, including addenda, in a timely manner to assist them in responding to the bid.
- **1.11.3** Negotiating in good faith with interested MBEs/WBEs DBEs that have submitted bids to the bidder.
- **1.11.4** Publishing notice in a local publication such as a newspaper, trade association publication or via electronic/social media.
- **1.11.5** Not rejecting MBEs/WBEs or DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities.
- **1.11.6** Making economically feasible portions of the work available to MBE/WBE or DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE or DBE subcontractors and suppliers, so as to facilitate meeting the goals or subgoals.
- **1.11.7** The ability or desire of the bidder to perform the project work with its own organization does not relieve the bidder of the responsibility to make Good Faith Efforts.
  - **1.11.8** Bidders are not required to accept higher quotes in order to meet the goals

or subgoals.

- **1.11.9** Effectively using the services of Minority Person/Women community organizations; Minority Person/Women Contractors groups; local, state and federal Minority Person/Women business assistance offices; and other organizations to provide assistance in solicitation and utilization of MBEs, WBEs and/or DBEs.
- **1.11.10** In assessing minimum Good Faith Efforts, the OWNER may consider (1) whether the bidder sought guidance from the City of Austin Small and Minority Business Resources Department (SMBR) on any question regarding compliance with these requirements; and (2) the performance of other bidders in meeting the goals.

For additional information, refer to the MBE/WBE or DBE Compliance Program Requirements Volume of the Project Manual.

Bid shopping is not allowed in conjunction with this solicitation and may result in the disqualification of prospective bidders and subcontractors.

#### 2. <u>ESTIMATES OF QUANTITIES (UNIT PRICE CONTRACTS ONLY)</u>

Quantities listed in unit price Bid form are to be considered approximate quantities and will be used only for comparison of Bids. Payment to CONTRACTOR will be made only for actual quantities of Work performed or materials furnished in accordance with Contract and it is understood that quantities may be increased or decreased as provided in Section 00700, General Conditions, and as may be modified by Section 00810, Supplemental General Conditions.

#### 3. DRAWINGS, PROJECT MANUAL AND SITE (S) OF WORK

Before submitting a Bid, the Bidder shall carefully examine the Bid Documents, site(s) of the proposed Work, soils, and other conditions that may affect the performance of the Work to satisfy the Bidder as to character, quality and quantities of Work to be performed and materials to be furnished. By submitting a Bid, the Bidder will be deemed to have certified that the Bidder has complied with these requirements. If, during preparation of the Bid, the Bidder discovers any suspected discrepancies or errors, the Bidder must immediately notify the Authorized Contact Person in writing of the suspected discrepancy or error. Failure to provide written notice of any suspected discrepancies or errors may be cause for rejection of the Bid.

#### 4. **BID GUARANTY**

All Bids shall be accompanied by a Bid guaranty in an amount of not less than five percent (5%) of the total Bid. Bid guaranty will be a Bid bond with Power of Attorney attached, issued by a solvent surety authorized under laws of the State of Texas and acceptable to OWNER. For Bidders electing to submit Bids and Bid Guaranties electronically via Austin Finance Online, Bid Guaranties will be verified by the Owner prior to bid certification and electronic copies of Bid Guaranties will not be returned to Bidders.

The Bid guaranty accompanying the Bid of the three (3) apparent low Bidders will be retained until Contract is awarded and successful Bidder executes Contract and furnishes required bonds and insurance, after which Bid guaranties will be returned to the Bidders. All other Bid guaranties will be returned after Bid certification. In the event that the Bidder to whom the Contract is awarded fails to execute the Contract within five (5) working days of receipt

of a complete set of Contract Documents whether in electronic or hard copy form, the Bidder agrees that the OWNER in its discretion may rescind the initial award and award the Contract to the next lowest responsible Bidder.

#### 5. PERFORMANCE AND PAYMENT BONDS

When performance and/or payment bonds are required, each shall be issued in an amount equal to the Contract Amount as security for the faithful performance and/or payment of all Contractor's obligations under the Contract Documents. Performance and payment bonds shall be issued by a solvent corporate surety authorized to do business in the State of Texas, and shall meet any other requirements established by law or by OWNER pursuant to applicable law.

#### 6. CONSIDERATION OF BID AMOUNT

For purpose of award, after Bids are opened, reviewed, and certified, the total amount of the Bid, including accepted Bid alternates, will be considered the amount of the Bid. Certified Bid tabulations will be made available to the public through the City's Vendor Connection website, log on www.austintexas.gov/financeonline/vendor\_connection/index.cfm. OWNER reserves the right to reject any or all Bids and to waive any minor informality in any Bid or solicitation procedure (a minor informality is one that does not affect the competitiveness of the Bids).

#### 7. SUBMISSION OF BID

Each Bid must be completed and signed by person(s) authorized to bind individual, partnership, firm, corporation, or any other legal entity submitting the Bid, and, shall include the following in one envelope or electronically via Austin Finance Online (see <a href="mailto:eResponse">eResponse</a>, Attachment 1 -Submitting Bids in Austin Finance Online):

- **7.1** One copy of Bid form (Section 00300L or 00300U) completed and signed.
- **7.2** Acknowledgment of receipt of Addenda issued in spaces provided in Bid form.
- **7.3** Required Bid guaranty (copy of Bid guaranty if submitted electronically via Austin Finance Online).
- **7.4** Required Information indicated in Drawings or Project Manual as specified in Section 00820.
- **7.5** One copy of Total Bid Form if bid is submitted electronically via Austin Finance Online.

Bid must be accompanied by an MBE/WBE or DBE Compliance Plan. Compliance Plans will either be submitted separately, in a second envelope or electronically via Austin Finance Online, prior to the date and time set forth in Section 00020, Invitation for Bids. The Compliance Plan forms are included in the MBE/WBE Procurement Program Package or DBE Procurement Program Package (a separately bound volume).

Bid shall include all specified items in this section submitted electronically via Austin Finance Online, or may be submitted to the Capital Contracting Office in a sealed envelope, clearly identified on outside as a Bid to OWNER, with Bidder's company name and address, project name, bid due date/time, signed acknowledgement of the number of Addenda received and authorized signature. Failure to submit Bid appropriately may subject Bidder to

disqualification.

Sealed Bids may be mailed using the address below:

### Address for US Mail (If mailed to the physical address, the proposal will be returned unopened)

City of Austin

Capital Contracting Office

P. O. Box 1088

Austin, Texas 78767-1088

NOTE: Bids must either be received and time stamped in the Capital Contracting Office prior to the Due Date and Time or submitted electronically via Austin Finance Online. The time of record for those electronically submitted is the time received in Austin Finance OnLine. It is the responsibility of the Offeror to ensure that their Bid arrives at the reception desk in the Capital Contracting Office or electronically prior to the time and date indicated. Arrival at the City's mailroom, mail terminal, or post office box will not constitute the Proposal arriving on time.

It is the sole responsibility of the Bidder to ensure timely delivery of Bid. OWNER will not be responsible for failure of service on the part of the U.S. Post Office, courier services, or any other form of delivery service chosen by the Bidder. (See Section 00820, Modifications to Bidding Requirements and Contract Forms, for modifications to solicitations without MBE/WBE or DBE goals.)

In submitting its Bid, Bidder certifies that it has not lobbied the City or its officials, managers, employees, consultants, or contractors in such a manner as to influence or to attempt to influence the bidding process. In the event it reasonably appears that the Bidder influenced or attempted to influence the bidding process, the City may, in its discretion, reject the Bid.

#### 8. WITHDRAWAL OF BID

A Sealed Bid may be withdrawn by a Bidder, provided an authorized individual of the Bidder submits a written request to withdraw the Bid prior to the time set for opening the Bids. For withdrawal of electronic bids see <a href="Maintenance-eResponse"><u>eResponse</u></a>, Attachment 1 -Submitting Bids in Austin Finance Online)

#### 9. **REJECTION OF BIDS**

- **9.1** The following **will** be cause to reject a Bid:
- **9.1.1** Failure to submit Section 00300 (Bid Form) and signed by an individual empowered to bind the Bidder.
- **9.1.2** Bids which are not accompanied by acceptable Bid guaranty, with Power of Attorney attached, or a letter certifying the Bidder's ability to be bonded, from a surety company, in accordance with Paragraph 4 above.
- **9.1.3** More than one Bid for same Work from an individual, firm, partnership or corporation.
  - **9.1.4** Evidence of collusion among Bidders.

- **9.1.5** Sworn testimony or discovery in pending litigation with OWNER which discloses misconduct or willful refusal by contractor to comply with subject contract or instructions of OWNER.
- **9.1.6** Failure to submit MBE/WBE or DBE Compliance Plan in accordance with the separately bound volume titled MBE/WBE Procurement Program Package or DBE Procurement Program Package.
- **9.1.7** Failure to have an authorized agent of the Bidder attend the mandatory Pre-Bid Conference, if applicable.
- **9.1.8** Bids received from a Bidder who has been debarred or suspended by OWNER's Purchasing Officer.
- **9.1.9** Bids received from a Bidder when Bidder or principals are currently debarred or suspended by Federal, State or City governmental agencies. (Applicable for Bid amounts equal to or in excess of \$25,000.00).
- **9.1.10** Bids received from a Bidder, who is identified on a list maintained by the Texas Comptroller of Public Accounts as a company known to have contracts with or provide supplies or services to a foreign terrorist organization, unless otherwise exempted from sanctions by the United States government.
- **9.2** The following **may** be cause to reject a Bid:
- **9.2.1** Poor performance in execution of work under a previous City of Austin contract.
  - **9.2.2** Failure to achieve reasonable progress on an existing City of Austin contract.
  - **9.2.3** Default on previous contracts or failure to execute Contract after award.
- **9.2.4** Evidence of failure to pay Subcontractors, Suppliers or employees in accordance with Contract requirements.
- **9.2.5** Bids containing omissions, alterations of form, additions, qualifications or conditions not called for by OWNER, or incomplete Bids may be rejected. In any case of ambiguity or lack of clarity in the Bid, OWNER reserves right to determine most advantageous Bid or to reject the Bid.
  - **9.2.6** Failure to acknowledge receipt of Addenda.
- **9.2.7** Failure to submit any of the items specified below in paragraph 11, "Submission of Post Bid Information".
- **9.2.8** Failure to identify a dollar amount (price) of a unit price(s) in the 00300U including all Bid Alternates in the Bid Form 00300U or 00300L.
- **9.2.9** Failure to submit post-Bid information within the allotted time(s) (see paragraph 11 for post-Bid requirements).
  - **9.2.10** Failure to timely execute Contract after award.

- **9.2.11** Previous environmental violations resulting in fines or citations by a governmental entity (i.e. U.S. Environmental Protection Agency, Texas Commission on Environmental Quality, etc.).
- **9.2.12** Safety record as set forth in Section 00410, Statement of Bidder's Safety Experience.
- **9.2.13** Failure of Bidder to demonstrate the minimum experience required as specified in Section 00400 if that Section is included in the bidding documents.
- **9.2.14** Evidence of Bidder's lack of sufficient resources, workforce, equipment or supervision, if required by inclusion of appropriate attachments in Section 00400.
- **9.2.15** Evidence of poor performance on previous Projects as documented in Owner's project performance evaluations.
- **9.2.16** Unbalanced Unit Price Bid: "Unbalanced Bid" means a Bid, which includes a Bid that is based on unit prices which are significantly less than cost for some Bid items and significantly more than cost for others. This may be evidenced by submission of unit price Bid items where the cost are significantly higher/lower than the cost of the same Bid items submitted by other Bidders on the project.

#### 10. PROTEST PROCEDURES

The OWNER's Capital Contracting Officer has the authority to settle or resolve any claim of an alleged deficiency or protest. The procedures for notifying OWNER of an alleged deficiency or filing a protest are listed below. If you fail to comply with any of these requirements, the Capital Contracting Officer may dismiss your complaint or protest.

- **10.1 Prior to Bid opening**: If you are a prospective Bidder and you become aware of the facts regarding what you believe is a deficiency in the solicitation process before the Bid is opened, you must notify OWNER in writing of the alleged deficiency before that date, giving OWNER an opportunity to resolve the situation prior to the Bid opening.
- **10.2 After Bid opening:** If you submit a Bid to OWNER and (1) you have been found non-responsive, or (2) you believe that there has been a deficiency in the solicitation process or the award, you have the opportunity to protest the solicitation process or the recommended award as follows:
- **10.2.1** You must file written notice of your intent to protest within four (4) calendar days of the date that you know or should have known of the facts relating to the protest. If you do not file a written notice of intent within this time, you have waived all rights to protest the solicitation process or the award.
- **10.2.2** You must file your written protest within fourteen (14) calendar days of the date that you know or should have known of the facts relating to the protest unless you know of the facts before the Bid has been opened. If you know of the facts before that date, you must notify OWNER as stated above.
- **10.2.3** You must submit your protest in writing and must include the following information:
  - .1 your name, address, telephone, and email address;

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- .2 the solicitation number and the CIP number, if applicable;
- **.3** a detailed statement of the factual grounds for the protest, including copies of any relevant documents.
- **10.2.4** Your protest must be concise and presented logically and factually to help with OWNER's review.
- **10.2.5** When OWNER receives a timely written protest, the Capital Contracting Officer will determine whether the grounds for your protest are sufficient. If the Capital Contracting Officer decides that the grounds are sufficient, the Capital Contracting Office will schedule a protest hearing, usually within five (5) working days. If the Capital Contracting Officer determines that your grounds are insufficient, you will be notified of that decision in writing.
- **10.2.6** The protest hearing is informal and is not subject to the Open Meetings Act. The purpose of the hearing is to give you a chance to present your case; it is not an adversarial proceeding. Those who may attend from OWNER are: representatives from the department that requested the purchase, the Law Department, the Capital Contracting Office, and other appropriate City staff. You may bring a representative or anyone else that will present information to support the factual grounds for your protest with you to the hearing.
- **10.2.7** A decision will usually be made within fifteen (15) calendar days after the hearing.
- **10.2.8** The Capital Contracting Officer will send you a copy of the hearing decision after the appropriate City staff has reviewed the decision.
- **10.2.9** When a protest is filed, OWNER usually will not make an award until a decision on the protest is made. However, OWNER will not delay an award if the City Manager or the Capital Contracting Officer determines that:
  - .1 OWNER urgently requires the supplies or services to be purchased, or
- **.2** Failure to make an award promptly will unduly delay delivery or performance.

In those instances, the Capital Contracting Office will notify you and make every effort to resolve your protest before the award.

The protest or notice of intent and the protest shall be submitted in writing to:

Address for Delivery Service: Address for US Mail:

City of Austin City of Austin

Capital Contracting Office Capital Contracting Office

ATTN: Capital Contracting Officer ATTN: Capital Contracting Officer

One Texas Center P.O. Box 1088

505 Barton Springs Rd. Austin, Texas 78767-1088

Suite 1045-A

Austin, Texas 78704 PHONE: 512/974-7141

#### 11. SUBMISSION OF POST BID INFORMATION

11.1 Prior to determination of the certified low Bidder, the three (3) apparent low Bidders must submit to OWNER the following information within three (3) business days of receipt

of notice of apparent low Bidder status by the OWNER:

- **11.1.1** One copy of Attachments A-I and any other specifically designated Attachments of the Statement of Bidder's Experience (Section 00400), completed and signed. (Unless provided to the contrary in Section 00820 Modifications to Bidding Requirements and Contract Forms). (Note: OWNER reserves the right to solely determine whether the comparable experience documentation provided by the Bidder is sufficient and relevant to the Work described in the Contract Documents for the Bidder to be considered a responsible Bidder.)
- **11.1.2** One Copy of the Certificate of Non-Suspension or Debarment (Section 00405), completed and signed. (Applicable for Bid amounts equal to or in excess of \$25,000.00.)
- **11.1.3** One copy of Section 00410, Statement of Bidder's Safety Experience, including required attachments, completed and signed.
- **11.1.4** One copy of the Title VI Assurances Appendix A (Section 00631), completed and signed.
- **11.1.5** One copy of the Title VI Assurance Appendix E (Section 00632), completed and signed.
- **11.1.6** One copy of Exhibit A Federal Provisions (Section 00810A) completed and signed. (Federal projects only)
  - **11.1.7** Such other information as is required to evaluate Bid or Bidder.
- **11.2** <u>Upon notification of status as certified low Bidder</u>, Bidder shall submit the following information to OWNER within three (3) business days:
- **11.2.1** Confirmation Letters between Bidder and all subcontractor(s) and all supplier(s) identified in the MBE/WBE Compliance Plan.
  - **11.2.2** Section 00425A, Insurance Cost Form. For ROCIP projects.
- **11.2.3** Section 00425B, Contractor Affidavit of Receipt and Provision of ROCIP Information, and Subcontractor Affidavit of Receipt and Provision of ROCIP Information (for Subcontractor(s) of all tiers identified in the MBE/WBE Compliance Plan). For ROCIP projects.
- **11.2.4** Such other information as required. In addition, the Bidder acknowledges and agrees that the failure to timely provide the additional information required by this section will result in a determination that, for the purposes of this solicitation, the Bidder has not provided sufficient information for the OWNER to be able to determine that the Bidder is a responsible Bidder.

#### 12. AWARD AND EXECUTION OF CONTRACT

OWNER will process Bids expeditiously. Award of Contract will be to the lowest, responsible Bidder meeting all requirements of the Bid Documents. OWNER may not award Contract to a nonresident Bidder unless the nonresident underbids the lowest Bid submitted by a responsible resident Bidder by an amount that is not less than the amount by which a resident Bidder would be required to underbid the nonresident Bidder to obtain a

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comparable contract in the state in which the nonresident's principal place of business is located.

Award of Contract will occur within the period identified on the Bid form, unless mutually agreed between the parties. Capital Contracting Officer shall submit recommendation for award to the City Council for those project awards requiring City Council action. Contract will be signed by City Manager or his/her designee after award and submission of required documentation by Bidder. Contract will not be binding upon OWNER until it has been executed by both parties. OWNER will process the Contract expeditiously. However, OWNER will not be liable for any delays prior to the award or execution of Contract.

Upon contract award, the selected Bidder must submit either their existing or an updated personnel policy (on letterhead) documenting conformity with City Code, Chapter 5-4, § 5-4-2. If the company does not submit a copy of their personnel policy incorporating the non-discrimination policy, the City of Austin Nondiscrimination Policy (Section 00630) will be considered the Bidder's nondiscrimination policy.

In any case of ambiguity or lack of clarity in the Bid, OWNER reserves the right to determine the most advantageous Bid or to reject the Bid.

Notwithstanding anything in this Section 00100 to the contrary, the OWNER may award a contract for construction services in an amount of less than \$100,000 to a bidder whose principal place of business is in the City of Austin and whose bid is within 5% of the lowest bid price received from a bidder whose principal place of business is not within the City of Austin, if the City finds that the local bidder offers the City the best combination of contract price and additional economic development opportunities for the City created by the contract award including the employment of resident of the City and increased tax revenues to the City.

#### 13. PARTNERING

In order to complete the Work in a manner that is most beneficial to the OWNER and CONTRACTOR, OWNER and CONTRACTOR may form a "Partnering Team", which will include the E/A, and any major Subcontractors. This partnering relationship will draw on the strength of all parties to identify and achieve mutual goals. The objectives of this partnering relationship are effective and efficient communication and Contract performance, which is intended to ensure that the Project is completed within budget, on schedule, and in accordance with the Drawings and Specifications and other Contract requirements. While the partnering relationship will be multilateral in makeup and participation will be totally voluntary, the OWNER and CONTRACTOR agree to cooperate and use reasonable good faith efforts to discuss and resolve any and all Project issues and disputes. Section 01100, Special Project Procedures and/or Section 01200, Project Meetings contain additional information regarding the intent of the partnering relationship and responsibilities of the entities entering into the partnering charter.

#### 14. ROCIP REQUIREMENTS

If the insurance on this Project will be under the Rolling Owner Controlled Insurance Program (ROCIP), the Bidder is directed to Section 00810, Supplemental General Conditions, Section 00820, Modifications to Bidding Requirements and Contract Forms, and the Project Safety Manual included with these contract documents for information and bidding requirements.

The Insurance Cost Form, Section 00425A must be accurately completed and submitted with the Bid to indicate insurance removed from Base Bid and Alternates. CONTRACTOR shall remove from the Bid the cost of insurance for the CONTRACTOR and Subcontractors of all tiers working on site.

The Rolling Owner Controlled Insurance Program Information, Section 00425 B, Contractor Affidavit of Receipt and Provision of ROCIP Information and Subcontractor Affidavit of Receipt and Provision of ROCIP Information for subcontractor(s) of all tiers identified in the MBE/WBE Compliance Plan must be accurately completed and submitted by the certified low bidder as a post bid submittal. Subcontractor Affidavits must be submitted throughout the duration of the Contract as Subcontractor(s) are added.

#### 15. SIGNATURE REQUIREMENTS

The Bid and any subsequent supporting Bid documents and Contract must be executed in the Bidder's full name and legal entity status by an authorized representative of the Bidder. Accordingly, a partnership/joint venture must file its partnership/joint venture agreement, a corporation must file its articles and bylaws, a limited liability company must file its certificate of organization and article of organization and regulations, and a limited partnership must file not only limited partnership agreement and the certificate of limited partnership, but also the documentation for its general partner, and any Bidder must file a copy of any assumed name certificate, or such limited portion of such documents reasonably establishing signature authority.

#### 16. CONTRACTOR EVALUATION

The Owner will review and evaluate the Contractor's Work and performance on the Project and provide the Contractor with a written Contractor Evaluation Report in accordance with City of Austin Administrative Rule R161-13.37. Rule R161-13.37 provides an appeal process. <a href="http://www.austintexas.gov/department/contract-management">http://www.austintexas.gov/department/contract-management</a>

### 17. TEXAS ETHICS COMMISSION CERTIFICATE OF INTERESTED PARTIES DISCLOSURE FORM

#### **17.1** Definitions:

- **17.1.1** "Interested Party" means a person who has a controlling interest in a Business Entity with whom the Owner contacts or who actively participates in facilitating the Contract or negotiating the terms of the Contract, including a broker, intermediary, adviser, or attorney for the Business Entity.
- **17.1.2** "Business entity" includes an entity through which business is conducted with a governmental entity or state agency, regardless of whether the entity is a for-profit or nonprofit entity. The term does not include a governmental entity or state agency.
- **17.2** As a condition to entering the Contract, the Business Entity constituting the successful Bidder must provide a Texas Ethics Commission Certificate of Interested Parties Form to the Owner at the time the Business Entity/Bidder submits the signed Contract to the Owner in full compliance with the following requirements under which the successful Bidder shall:
  - **17.2.1** Go to the Ethics Commission's website (<u>www.ethics.state.tx.us</u>),

#### Bidding Requirements, Contract Forms and Conditions of the Contract

- **17.2.2** Complete the "Interested Parties" information, in accordance with the requirements of the Texas Ethics Commission Rules published at Title 1, Part 2, Chapter 46, of the Texas Administrative Code and available on the referenced website,
  - **17.2.3** Include the City's contract identification number,
- **17.2.4** Include a short description of the goods or services to be used by the City, and
- **17.2.5** Indicate whether each interested party has a controlling interest in the business entity, is an intermediary in the contract for which the disclosure is being filed, or both.
- **17.3** In accordance with the Commission Rules, the Certificate of Filing and completed Certificate of Interested Parties must be (i) printed, (ii) signed by an authorized agent of the business entity, and (iii) submitted to the City at the time of the submission of the signed contract to the City. The City then must notify the Ethics Commission in electronic format of receipt of the document within 30 days of contracting and the Commission will make the disclosure of interested parties available to the public on its website.

**END** 

#### **GEOTECHNICAL DATA**

Section 00220

#### 1. OVERVIEW

Depending on Project requirements, OWNER may have obtained geotechnical information, which may include laboratory test results and logs of borings from geotechnical consultants. That information will be included in this section and/or on the Drawings. The CONTRACTOR shall be familiar with the subsurface materials and conditions on the Project and shall be knowledgeable of how they will affect the Work. The following is a partial listing of sources of information available to the CONTRACTOR about subsurface materials and conditions: the geotechnical information provided by the OWNER; geologic maps, publications and reports available from the University of Texas Bureau of Economic Geology at the J.J. Pickle Research Center in Austin, Texas; subcontractors familiar with local ground conditions; and, local consulting geologists and geotechnical engineers. The CONTRACTOR may make their own subsurface investigations.

Springdale Road/ US Highway 290 Waterline Improvements Geotechnical Baseline Report and Compiled Geotechnical Data Reports, dated May 6-7, 2018, prepared by Jacobs are attached. The requirements in the Drawings and Specifications shall be used in the event of a conflict between this report and the Drawings and Specifications.

**END** 



### Springdale Road/ US Highway 290 Waterline Improvements

City of Austin Department of Public Works

**Geotechnical Baseline Report** 

January 8, 2020

Prepared by: Marcelo Azevedo

Reviewed by: Diana Worthen (TX, WA, CA, and OR P.E.)





#### Springdale Road / US 290 Waterline Improvements Geotechnical Baseline Report

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#### Springdale Road / US 290 Waterline Improvements Geotechnical Baseline Report

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#### 1. Introduction

#### 1.1 Project Information

The City of Austin Department of Public Works has commissioned Jacobs Engineering to complete design for a portion of the Springdale Road/ US Highway 290 Waterline Improvements project to be constructed by Horizontal Directional Drilling (HDD). A total of three HDD crossings are addressed by this report including one HDD installation of a 20-inch diameter pipe along US 290 (US 290 alignment) and Springdale Road that crosses the Ferguson Branch Creek and Walnut Creek. Additionally, there will be two parallel HDD line installations (20-inch and 12-inch) along Springdale Road from Ferguson Lane to Breeds Hill to cross Walnut Creek. All pipe materials will be high density polyethylene (HDPE) (PE 4710), dimension ratio 9 (DR9), specified in ductile iron pipe size (DIPS).

#### 1.2 Purpose and Use of the Geotechnical Baseline Report

#### 1.2.1 Purpose

This Geotechnical Baseline Report (GBR) provides a contractual baseline for the anticipated soil conditions and material behavior that will be encountered during construction of the HDDs as part of the Springdale Road/ US Highway 290 Waterline Improvements project. This GBR is solely for use in the trenchless construction portion of this project and sets baselines for the geologic and geotechnical conditions which serve as a basis for bidding. It also provides a basis for evaluation of differing site conditions to assist in resolution of disputes that may arise over subsurface conditions. The construction considerations provide an explanation or clarification of the site constraints and geotechnical conditions that may have driven the layout or siting of the project.

In addition, this GBR provides the following information:

- Identifies considerations, key project constraints, and requirements that must be addressed by the Contractor during bid preparation and construction.
- Provides information to assist the Contractor in evaluating requirements for excavating and supporting the ground.
- Provides guidance to the construction management team in administering the contract and monitoring Contractor performance.

Items baselined in this GBR include subsurface soil and groundwater conditions, ground behavior in response to tunneling, soil strength, and other factors and conditions that affect final design and construction of the project.

#### 1.2.2 Use

This GBR provides the basis for identifying geotechnical and geologic conditions. The geotechnical baseline condition (baseline) contained in this GBR is not necessarily geotechnical fact. The baseline was developed using judgment to interpolate between borings and extrapolate beyond the boring logs and laboratory test data. The judgment applied in the interpolations and extrapolations reflects the views of the City of Austin and the City's design consultant in describing the baseline. Bidders should use the baseline subsurface conditions and the surface conditions that can be observed during a site visit as the basis for bids. It should be noted that the project design was based on assumed construction methods (HDD). The behavior of the geologic materials present in the surface and subsurface excavations will be influenced by the Contractor's selected equipment, means, and methods.

### Springdale Road / US 290 Waterline Improvements Geotechnical Baseline Report

Geotechnical data are contained in the geotechnical data report (GDR) compiled by Jacobs (2018). The GDR compilation includes data collected from geotechnical investigations performed by MLA Labs in 2014 and ECS in 2012. In no case shall the data contained in the GDR take precedence over the information contained in this GBR.

Plans and figures contained in related documents facilitate an understanding of related site conditions and elements of the work. These plans and figures are referenced, but are not provided in this report. Additional documents used to develop this GBR are listed in the References section of this report. These documents are not incorporated as contract documents and are listed for reference only.

All references to drawing Sheets or station numbers refer to the 100% Construction Drawing Submittal, prepared by Jacobs and dated September 21, 2018.

#### 1.3 Organization of Report

This report is organized into the following sections:

- Section 1: Introduction Provides a general project overview and outlines the purpose of the GBR.
- Section 2: Project Overview Describes the proposed pipeline alignments and crossings.
- Section 3: Sources of Information Provides sources of project information, geologic project setting, and any existing facilities and utilities.
- Section 4: Ground Characterization and Baseline Describes conditions encountered along the proposed alignments of the three HDD crossings. Presents baseline conditions and key material properties expected during construction.
- Section 5: Construction Considerations Provides considerations that should be addressed during construction of the three HDD crossings.
- Section 6: References Provides a list of references referred to in this GBR.

#### 1.4 Limitations

This GBR presents baselines with respect to certain subsurface conditions that are expected to be encountered during construction that may influence the contractor's rate of progress, tooling selection, tool wear, or approach to bidding the project. The GBR establishes a contractual basis for allocation of geotechnical risk during performance of the work; it does not define the single correct interpretation of geotechnical conditions. The baselines contained herein are not intended to be a guaranty or warranty that certain conditions will be encountered, as actual subsurface conditions will be variable. This baseline report represents the conditions the contractor should assume for bidding purposes and for which the contractor is responsible for during construction.

#### 2. Project Overview

#### 2.1 Background

The Springdale Road/ US Highway 290 Waterline Improvements project includes the construction of new water pipelines. The pipelines will be constructed by HDD techniques. One of the pipelines cross beneath Ferguson Creek and Walnut Creek along US 290. The other two pipelines cross Walnut Creek along Springdale Road. The planned crossings are about a mile east of the intersection of US 290 and US 183. The new pipelines will be connected at both the entry and exit of the HDD bores via new PVC pipeline connections installed with open-cut construction methods. All three pipelines are designed to convey water.

The three trenchless crossings are the focus of this GBR.

#### 2.2 Trenchless Crossings

There are three HDD installations on this project. All HDDs have been laid out and designed to avoid the City of Austin Erosion Hazard Zone associated with the creeks.

The crossing along US 290 has been designed assuming the pipe string layout space is located on TxDOT right of way. The pipe will consist of DIPS DR9 PE4710 HDPE pipe. There is a small elevation difference between the west and the east end of the crossing, with the east end approximately 7 feet higher than the west end.

Both crossings along Springdale Road have been designed assuming the pipe string layout space is located on TxDOT right of way. The pipes will consist of DIPS DR9 PE4710 HDPE pipe. There is a small elevation difference between the southwest and the northeast end of the crossings, with the northeast end approximately 15 to 20 feet lower than the southwest end.

A plan of the crossings and a profile depicting the existing ground surface, topography, and proposed pipe alignments are shown on Sheets 71 to 78 of the Construction Drawings.

#### 2.2.1 20" Water Line 'A'

The longest crossing is the combined crossing of Ferguson Creek and Walnut Creek along US 290. It is sometimes referred to as the US 290 alignment. This crossing is along the north side of US 290, is approximately 1,937 feet long, and will consist of 20-inch diameter DIPS DR 9 PE 4710 HDPE pipe. To stay within the existing US 290 easement, there are two horizontal curves along the alignment. The horizontal curves do not overlap, nor do they overlap the vertical curves.

#### 2.2.2 12" Water Line 'B'

The shortest crossing is the 12-inch diameter crossing of Walnut Creek along Springdale Road. This crossing is along the north side of Springdale Road, is approximately 887 feet long, and will consist of 12-inch diameter DIPS DR 9 PE 4710 HDPE pipe. There is an 18-foot elevation difference between the entry and exit sides

#### 2.2.3 20" Water Line 'C'

The second longest crossing is the 20-inch diameter crossing of Walnut Creek along Springdale Road. This crossing is along the north side of Springdale Road, is approximately 1,458 feet long, and will consist of 20-inch diameter DIPS DR 9 PE 4710 HDPE pipe. There is a 15-foot elevation difference between the entry and exit sides.

### Springdale Road / US 290 Waterline Improvements Geotechnical Baseline Report

The alignments for Water Lines 'B' and 'C' are parallel and do not cross one another horizontally or vertically. There is a minimum vertical separation distance of 5 ft and horizontal distance of 10 ft between the centerlines of the pipes.

# 3. Regional Setting and Geologic Conditions

#### 3.1 Data Sources

The primary source of geotechnical data used to develop the baseline conditions are geotechnical explorations and testing completed for this project. The details and results of the geotechnical explorations, groundwater information, and geotechnical laboratory testing are provided in two GDRs and include:

- "Geotechnical Investigation, Geotechnical Data Report" for the Springdale Road/US 290 Water Improvements, Austin, Texas, prepared by MLA Labs Inc., dated December 2014.
- "Geotechnical Data Report" for the Springdale/Hwy 290 Water System Improvements, Austin, Texas, prepared by ECS-Texas, LLP, dated December 2012.

#### 3.2 Regional Setting and Geology

The crossings addressed in this report are east of the Balcones Fault Zone of Austin in a low-lying coastal plain region of Texas which does not typically contain geologic faulting and, as such, does not typically have variable subsurface conditions due to faulting. Regardless, numerous contacts will be encountered during the HDD crossings. These contacts will be between soils and bedrock of contrasting properties including stiff clay, hard clay, shale, and limestone.

The geology of the project area consists of Lower Colorado River Terrace Deposits and Quaternary Alluvium overlying the Taylor Group, which in turn overlies the Austin Group (Garner et al., 1976). The alluvium consists primarily of sandy clay with trace gravel. The terrace deposits consist of sand and fine gravel layers with some clay. The Taylor Group consists of very stiff high plasticity clay overlying hard shale, with occasional thin layers of quartz and calcareous siltstone. Because of the composition of the clay in this formation, there can be extensive volume changes with varying water content. The Austin Group consists of layers of chalky limestone and calcareous clay.

#### 3.3 Existing Utilities

Several existing utilities run through the project site, affecting the design and construction of the proposed HDD crossings of the Colorado River. The existing utilities are discussed in this section.

The existing utilities are labeled in the plan and profile sheets of the construction drawings. The utilities listed herein and shown on the construction drawings may not identify all of the utilities within the area of the HDD alignment, but should list most of the existing utilities. The Contractor should take care to note any additional existing utilities and maintain a safe working distance with all equipment during construction.

## 3.3.1 Existing Utilities in the Vicinity of Water Line 'A'

Existing 8-inch diameter water, 21-inch diameter wastewater, and 6-inch diameter gas pipelines are located on the north side of US 290, generally following the alignment of the Water Line 'A'. The existing water line is constructed of ductile iron pipe material and is located approximately 5 to 10 feet below the ground surface. The existing gas line is constructed of steel and is located approximately 15 feet below the ground surface. The existing wastewater line is constructed of PVC material and is located between 5 to 10 feet below the ground surface.

The wastewater line has a 12-inch diameter tees perpendicular to the 21-inch main line, which Water Line 'A' crosses over horizontally. There is a minimum of 8 feet of vertical distance between the HDD line and a 12-inch water line tee near the HDD entry point. The HDD also horizontally crosses over the 8-inch water line and 6-inch gas line. There is typically greater than 40 ft of vertical distance between the existing water/gas utilities and the

new HDD line. Near the exit point of the HDD, the existing gas/water utilities are a minimum vertical distance of 5 feet away from the HDD line. The HDD line also crosses several telecom lines at its eastern end. The telecom lines are generally located less than 5 feet below ground surface.

At two locations along the alignment for Water Line 'A', the HDD line crosses existing reinforced concrete pipe. At STA 16+60, there is an existing 66-inch wastewater line which crosses about 10 feet above the HDD line. At STA 22+51.5, there is an existing 30-inch storm sewer line which crosses about 15 feet above the HDD line.

#### 3.3.2 Existing Utilities in the Vicinity of Water Lines 'B' and 'C'

An existing 8-inch diameter water pipeline is located on the west side of Springdale Road, generally following the alignment of the Water Lines 'B' and 'C'. The existing water line is constructed of cast iron pipe material and is planned to be abandoned in-place. There are several 1-inch diameter water lines, 1-inch diameter gas lines, and a 12-inch water line that cross the HDD alignment on Springdale Road. These existing utilities are identified on the Construction Documents and are generally near the surface.

# 4. Ground Characterization and Groundwater Conditions

#### 4.1 Soil Classification

In the preparation of this GBR, soil was classified using the Unified Soil Classification System in accordance with American Society for Testing and Materials (ASTM) D2487. The consistency and relative density of the soil included in the soil description were based on the standard penetration test (SPT) blow count, obtained during the subsurface investigation, to determine relative resistance to penetration. Whenever correlations to blow count are used, the blow counts reported in the boring logs must be corrected for varied drilling and sampling methods. The corrected blow counts were obtained by multiplying the blow counts shown on the logs with the factor shown in Table 1.

TABLE 1
Summary of Correction Factor to Blow Counts Shown on Project Boring Logs
Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements Project

Drive Method	Standard Split Spoon Sampler (2-inch outside diameter)
Automatic Trip Hammer	1.5

The field blow counts were also corrected for drill rod length to account for the varying amount of energy delivered to the drive samples resulting from reflection of energy within the drill rod. Field blow counts from samples within the following depth ranges were multiplied by the following factors to obtain the corrected blow count:

0 to 13 feet: 0.75

13 to 20 feet: 0.85

• 20 to 30 feet: 0.95

• 30 to 100 feet: 1.0

#### 4.1.1 Consistency and Relative Density

The consistency and unconfined compressive strength (UCS) for cohesive soils and relative density for granular materials encountered were determined using the guidelines presented in Terzaghi et al. (1996), as summarized in Table 2.

TABLE 2
Summary of Consistency / Relative Compaction Descriptors and Unconfined Compressive Strength
Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements Project

Soil Type	Description	Corrected Blow Count (N60) (bpf)	UCS (tsf)
Cohesive	Very Soft	0 to 2	< 0.25
(Clays)	Soft	3 to 4	0.25 to 0.5
(Silts)	Firm	5 to 8	0.5 to 1.0
	Stiff	9 to 15	1.0 to 2.0
	Very Stiff	16 to 30	2.0 to 4.0
	Hard	> 30	4.0 to 10.0

TABLE 2
Summary of Consistency / Relative Compaction Descriptors and Unconfined Compressive Strength
Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements Project

Soil Type	Description	Corrected Blow Count (N <sub>60</sub> ) (bpf)	UCS (tsf)
Non-cohesive	Very Loose	0 to 4	N/A
(Sands)	Loose	5 to 10	N/A
(Gravels)	Medium Dense	11 to 30	N/A
	Dense	31 to 50	N/A
	Very Dense	> 50	N/A

Notes:

bpf = blow(s) per foot N/A = not applicable

tsf = ton(s) per square foot

#### 4.1.2 Ground Behavior

Anticipated ground behavior was evaluated for stand-up time and face stability using the Tunnelman's Ground Classification (Heuer, 1974). This provides an indication of the ground behavior that can be expected if the tunnel face is left unsupported during excavation. The estimated behavior often is used to assist in selecting suitable excavation, tunneling, and ground support methods. The Tunnelman's Ground Classification can be applied to both cohesive and cohesionless soils, both above and below the water table. General ground behavior descriptions are defined in Table 3.

TABLE 3
General Ground Behavior and Tunnelman's Ground Classification
Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements Project

Classification	Potential Ground Behavior When Exposed in Tunnel	Characteristics
Swelling	Ground absorbs water, increases in volume, and expands slowly into tunnel.	Highly plastic clays.
Firm	Heading can be advanced without initial support.	Hard clays and cemented sands and gravels.
Slow Raveling	Chunks or flakes of material begin to drop out of the arch or face sometime after the ground has been exposed.	Sands with clay or silt binder or fine sands above the water table.
Fast Raveling	Chunks or flakes of material begin to drop out of the arch or face within a few minutes of exposure.	Sands with clay or silt binder or fine sands below the water table.
Running and Cohesive Running	Immediately upon exposure, the soil "runs" like a granulated sugar until the slope angle equals about 34 degrees. If the run is preceded by a brief period of raveling, the ground is called cohesive running.	Clean sand above the water table.
Flowing	Material with sufficient cohesion to stand for a brief period of raveling before it breaks down and flows as a mixture of soil and water into the heading. The mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances as it accumulates in the tunnel.	Silt, sand, and gravel beneath the water table without clay to develop appreciable cohesion or cementation.

Source: Modified after Heuer, 1974.

#### 4.2 Subsurface Conditions

The following sections define the conditions or measured properties encountered during exploration and present baselines for construction. Plans of the crossings and profiles for each pipeline alignment are shown in Sheets 71 to 78 of the construction drawings. Data from all borings presented in the GDR were used in the analysis of the layer properties.

The various soil and bedrock materials that will be encountered in the crossings have been grouped into Engineering Units (EUs) of similar textural and behavioral characteristics. Two of the EU's are soil and two are rock. The contacts between the EU's may be oblique to the orientation of the borehole and will require monitoring to maintain borehole alignment.

#### 4.2.1 Unit 1 - Surficial Clay

Unit 1 consists of stiff, low-plasticity clay with some sand and gravel. This unit is not expected to exhibit swelling characteristics. One fines content laboratory tests was conducted on a sample within the surficial clay layer, with the test yielding a fines content of 85 percent.

**Baseline:** The Surficial Clay layer will consist of a low plasticity clay with some sand and gravel, and a fines content of 85 percent.

#### 4.2.1.1 Ground Classification

**Baseline:** The Surficial Clay layer will exhibit a slow raveling behavior (above the water table). Stand-up time is estimated to be 100 minutes.

#### 4.2.2 Unit 2 - Highly Plastic Clay

Unit 2 consists of hard, high plasticity clay and weathered shale. Multiple fines content tests were conducted on samples within the clay layer, with fines content results between 94 to 97 percent, and an average fines content of 95 percent.

Atterberg Limits laboratory test results for the Highly Plastic Clay layer included a Plasticity Index (PI) ranging from 34 to 49, with an average value of 39. Due to the high plasticity, it is expected that this unit will exhibit swelling characteristics, will require special drilling mud additives to control the swelling ground during drilling, and may require oversizing the maximum reamer diameter to accommodate the swelling soils.

**Baseline:** The Highly Plastic Clay layer will consist of a highly plastic clay with a fines content of 95%, a Plasticity Index (PI) of 40, and a very high swell potential.

#### 4.2.2.1 Ground Classification

**Baseline:** The Highly Plastic Clay layer will exhibit a firm to swelling behavior (below the water table). Stand-up time is estimated to be over 30 hours.

#### 4.2.3 Unit 3 - Shale

Unit 3 is composed of intact shale. The shale was described during investigation as moderately weak, fossiliferous, slightly to highly weathered, and with very closely to closely spaced horizontal bedding planes. The rock quality designation (RQD) for this unit varies from 40 to 100, with an average of 80 and a standard deviation of 17.

The slake durability of this unit (i.e. how difficult the engineering unit is able to be broken up when subject to wetting and drying cycles) ranged from 53% to 89% and is categorized as medium durability. This will impact the

progress that a driller can make through the material with all phases of drilling, will require drill bits, rock hole openers, cutting heads, and reamers suitable for rock, and may require additional swab passes between reaming passes to clean the borehole.

Shale and other claystone rocks typically exhibit a range of Cerchar Abrasivity Index (CAI) between 0 to 1.25 (Plinninger et al., 2003), which is classified as a low abrasiveness material (ASTM D7625-10). Note that no CAI tests were conducted on the samples collected in the field investigation. Based on experience with the local soils, the shale along the pipeline alignment will likely have a low abrasiveness.

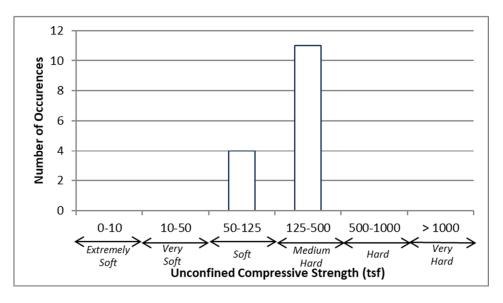
The shale in this unit is montmorillonitic, indicating that if the shale is broken down into soil, it may exhibit swelling characteristics similar to Unit 2.

Baseline: The Shale layer will consist of intact shale with a slake durability index of 70% and low abrasivity.

#### 4.2.3.1 Unconfined Compressive Strength

Several unconfined compressive strength (UCS) test were performed on samples from the Shale following ASTM D2166. Values ranged from 61 tsf to 236 tsf, with an average strength of 154 tsf and a standard deviation of 46 tsf. A histogram of the UCS laboratory data is presented in Chart 1.

CHART 1 **Histogram of Unconfined Compressive Strength of the Shale**Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements



**Baseline:** The baseline unconfined compressive strength (UCS) for the Shale is 200 tsf, indicating medium hard rock.

#### 4.2.4 Unit 4 - Limestone

Unit 4 is composed of intact limestone. This unit will not exhibit swelling characteristics. The limestone was described during investigation as moderately weak, fossiliferous, slightly to highly weathered, and with closely to moderately closely spaced bedding planes. The RQD for this unit varies from 23 to 100, with an average of 82 and a standard deviation of 23.

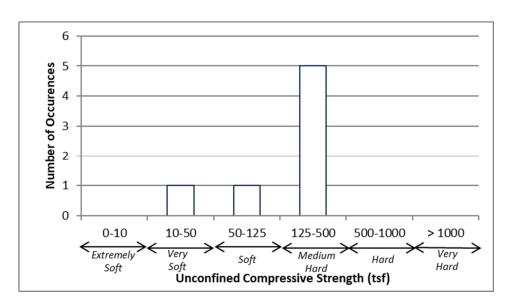
Limestone rock typically exhibits a CAI range between 0.75 to 1.75 (Plinninger et al., 2003), which is classified as a low to medium abrasiveness material (ASTM D7625-10). Note that no CAI tests were conducted on the samples collected in the field investigation. Based on experience with the local soils, the limestone along the pipeline alignment will likely have a low to medium abrasiveness.

Baseline: The Limestone layer will have a medium abrasivity.

#### 4.2.4.1 Unconfined Compressive Strength

Several unconfined compressive strength (UCS) test were performed on samples from the limestone following ASTM D2166. Values ranged from 43 tsf to 248 tsf, with an average strength of 162 tsf and a standard deviation of 73 tsf. A histogram of the UCS laboratory data is presented in Chart 2.

CHART 2 **Histogram of Unconfined Compressive Strength of the Limestone**Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements



**Baseline:** The baseline unconfined compressive strength (UCS) for the Limestone is 225 tsf, indicating medium hard rock.

#### 4.3 Groundwater Conditions

During drilling, groundwater was encountered in MLA Labs borings (drilled in October 2014) B-23A and B-27A at depths ranging from 22 to 27 feet below ground surface (bgs). Groundwater was also encountered in ECS borings (drilled in November 2012) B-22, B-24, B-27, and B-31 at depths ranging from 13.5 to 18.5 feet bgs. These groundwater levels correspond to El. 486 to El. 525 ft. The groundwater levels will fluctuate seasonally corresponding to the water levels in the creeks and annual rainfall.

**Baseline:** The baseline surface and groundwater levels are the elevation of the Ordinary High-Water Mark (OHWM) for each creek crossing as shown on the drawings that are part of the Contract Documents.

#### 4.4 Engineering Units along Pipe Alignments

The stationing outlined in the following sections assumes that the entry and exit points of the bore are at the existing ground surface. Additionally, the stationing for this project follows the borepath of the pipe alignments.

The subsurface profile is depicted in Figures 1 and 2. The figures are for visual reference, and if there is a discrepancy between Figures 1 and 2 and the stationing in Sections 4.4.1 through 4.4.3, the stations shown in the tables supersede.

#### 4.4.1 20-inch Diameter Water Line 'A' – US 290 Alignment

For baseline purposes, the US 290 alignment will be drilling through the following:

Unit	Begin Station	End Station
Unit 1	5+21	6+20
Unit 2	6+20	7+35
Unit 3	7+35	12+25
Unit 4	12+25	20+25
Unit 3	20+25	22+65
Unit 2	22+65	24+58

<sup>\*\*\*</sup> Note: Stationing should be considered accurate +/- 25-feet

#### 4.4.2 12-inch Diameter Water Line 'B' – Walnut Creek Crossing along Springdale Rd.

For baseline purposes, the alignment will be drilling through the following:

Unit	Begin Station	End Station
Unit 1	2+02	3+00
Unit 2	3+00	3+30
Unit 3	3+30	3+75
Unit 4	3+75	8+65
Unit 3	8+65	8+95
Unit 2	8+95	9+40
Unit 1	9+40	10+89

<sup>\*\*\*</sup> Note: Stationing should be considered accurate +/- 25-feet

#### 4.4.3 20-inch Diameter Water Line 'C' – Walnut Creek Crossing along Springdale Rd.

For baseline purposes, the alignment will be drilling through the following:

Unit	Begin Station	End Station
Unit 1	1+80	2+80
Unit 2	2+80	3+15
Unit 3	3+15	3+50
Unit 4	3+50	10+75
Unit 3	10+75	10+90
Unit 2	10+90	11+40
Unit 1	11+40	12+86

<sup>\*\*\*</sup> Note: Stationing should be considered accurate +/- 25-feet

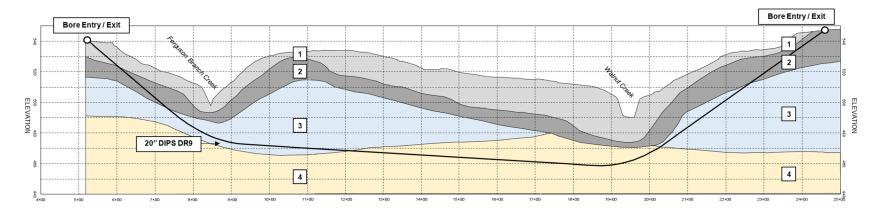


FIGURE 1

Baseline Subsurface Interpretation – Water Line A

Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements

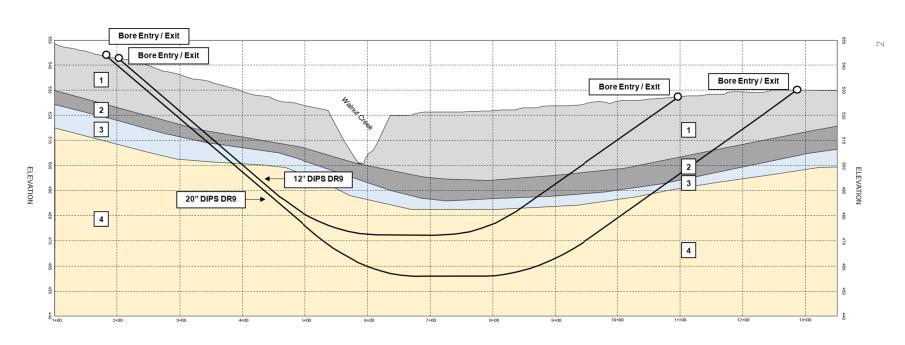


FIGURE 2

Baseline Subsurface Interpretation – Water Lines B and C

Geotechnical Baseline Report – Springdale Road / US 290 Waterline Improvements

# 5. Design and Construction Considerations

#### 5.1 General

All construction activities must be completed within established easements shown on the contract drawings. The Contractor is responsible for protecting existing utilities and structures, and for restoring the ground surface following construction. The Contractor must also adhere to restrictions related to environmental requirements and any permit requirements.

All material excavated from the trenchless crossings will be removed and disposed of offsite. This material includes drilling fluid used in HDD construction, including bentonite and polymers. The Contractor will submit a detailed plan for muck disposal before trenchless construction begins.

#### 5.2 Horizontal Directional Drilling

HDD will be used to construct the pipeline undercrossings of Ferguson Branch Creek and Walnut Creek. This method was selected for its cost-effectiveness, low risk of settlement, and ability to cross under the river without excavating deep shafts. The design geometry of the bore is based on the minimum required depth below the creeks to maintain clearance for the City of Austin Erosion Hazard Zone.

HDD operations will be controlled by the Contractor to avoid pipe damage, displacement of the pipe from the specified alignment grade, damage to adjacent structures and utilities, inadvertent drilling fluid returns, and settlement or heaving of the ground surface. The equipment and tooling for installation of the pipe will be compatible with the baseline ground conditions at the site and capable of meeting the construction needs of the project.

The contractor's work plan should account for the elevation differences between entry and exit of the bore. Entry and exit configuration and layout are considered part of the Contractor's means and methods.

#### 5.2.1 Identified Tunneling Risks

#### 5.2.1.1 Steering at the Soil-Rock Interface

The contact between the soil engineering units (Units 1 to 2) and the rock engineering units (Unit 3 to 4) may pose challenges for obtaining a "bite" into the harder rock, pilot bore steering, and maintaining alignment. The Contractor should be prepared to adjust steering as needed and re-drill as needed.

#### 5.2.1.2 Swelling Soils

Potential sources for delay include the swelling characteristics of Units 2 and 3, and the durability of Units 3 and 4. The swelling potential of Unit 2 and 3 may require an increased maximum reamer diameter and Unit 4 may require smaller upsizes between reaming passes and additional reaming passes. The Contractor should consider these potential sources of delay in planning their work.

#### 5.2.1.3 Elevation Differential along HDD Alignment

The approximate up to 20-foot elevation difference between the entry and exit points of the proposed HDD alignments may pose challenges for controlling downhole pressures and drill fluid management. If the planned direction of drilling results in the entry side of the HDD crossings being lower than the exit point, the Contractor may expect and plan for high downhole pressures at the lower elevations near the rig, and it may be necessary to maintain fluid in the higher elevations of the borehole during reaming and pullback.

#### 5.2.1.4 Close Alignment Spacing

The proposed 10-foot separation between HDD alignments may introduce the risk of drilling fluid loss to the adjacent borehole, or in the case of steering outside of tolerances, intersecting an adjacent borehole. The HDD bore profiles have been planned at different elevations to minimize this risk, however, the Contractor should take care to steer within tolerances and take measures to minimize the risk of losing drilling fluid to an adjacent borehole.

#### 5.2.1.5 Inadvertent Returns During HDD

When the drilling fluid pressure in the borehole exceeds the overburden pressure, inadvertent return of drilling fluid to the surface, commonly referred to as "frac-out," can occur. Risk of inadvertent returns is high when the pilot bore is near the ground surface at the entry and exit points. It shall be the Contractor's responsibility to control drilling speed, slurry properties, and HDD operations to avoid excessive fluid pressures, which may result in inadvertent returns to the ground surface. Similarly, it shall be the Contractor's responsibility to design a suitable bentonite slurry and combination of additives to stabilize drill hole pressures and undertake other measures, such as conductor casings, as necessary to prevent inadvertent returns.

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# Springdale Road/ US Highway 290 Waterline Improvements

City of Austin Department of Public Works

# **Compiled Geotechnical Data Reports**

January 8, 2020





# **Compiled Geotechnical Data Reports**

# Contents

Appendix A. MLA Geotechnical Data Report, Dec 2014
Appendix B. ECS Geotechnical Data Report, Dec 2012

# 1. Introduction

The purpose of this document summarize the geotechnical data obtained in support of the Horizontal Directional Drilling (HDD) design for the Springdale / US Hwy 290 Improvements.

Soil conditions were evaluated by reviewing borings from the "Geotechnical Investigation, Geotechnical Data Report" for the Springdale Road/US 290 Water Improvements, Austin, Texas prepared by MLA Labs Inc. dated December 2014. Previous geotechnical information from the Geotechnical Data Report" for the Springdale/Hwy 290 Water System Improvements, Austin, Texas prepared by ECS-Texas, LLP in December 2012 was also reviewed.

The ECS geotechnical exploration program was completed in December 2012. After review of the boring logs, it was determined that the geotechnical program did not provide sufficient information and was not consistent with post-exploration review and laboratory inspection of the soil and rock samples. Additional geotechnical explorations were completed in December 2014. In a broad sense, the two geotechnical exploration programs encountered somewhat similar soil conditions and provides an indication of the variability of soil conditions.

In an effort to provide as much information to the driller as possible and to provide transparency of project approach, both sets of geotechnical data have been provided herein.



# Appendix A. MLA Geotechnical Data Report, Dec 2014



# GEOTECHNICAL INVESTIGATION GEOTECHNICAL DATA REPORT

# Springdale Road/US 290 Water Improvements Austin, Texas

Report For:

**City of Austin** 

505 Barton Springs Road Suite 900 Austin, Texas 78704

December 2014

Engineer's Job # 14106090.002

MLA LABS, INC.

**Geotechnical Engineering and Construction Materials Testing** 

"put us to the test"
TBPE Firm # F-2684

Timothy R. Weston, P.E.

Vice President

Christopher P. Elliott Project Manager

Matthew J. Rodriguez, E.I.T. Assistant Project Manager

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# GEOTECHNICAL INVESTIGATION Geotechnical Data Report

### Springdale Road/US 290 Water Improvements Austin, Texas

#### **BACKGROUND**

This report presents the results of a soil exploration and analysis for *Springdale Road/US* 290 Water Improvements in Austin, Texas. Authorization to perform this exploration and analysis was by Master Agreement (MA PA130000061) with the City of Austin accepted September 3, 2014.

The purposes of this investigation were to provide the basis of the soil profile and the engineering characteristics of the foundation soil. The scope included a review of geologic literature, a reconnaissance of the immediate site, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation of the foundation materials.

The exploration and analysis of the subsurface conditions reported herein is considered sufficient in detail and scope to form a reasonable basis for the conclusions made herein. The recommendations submitted are based on the available soil information and the assumed preliminary design for the proposed project described herein. Any revision in the plans for the proposed project from those stated in this report should be brought to the attention of the Geotechnical Engineer so that he may determine if changes in the conclusions and/or recommendations are required. Construction should be monitored by a qualified inspector so that deviations from expected conditions can be properly evaluated.

This report has been prepared for the exclusive use of the client and their design professionals for specific application to the proposed project in accordance with generally accepted geotechnical engineering practice. This report is not intended for use as a specification or construction contract document, but as a guide and information source to those qualified professionals who prepare such documents.

#### PROJECT DESCRIPTION AND ASSUMPTIONS

The proposed project is located in Austin, Texas, at the intersection of US Highway 290 and Springdale. Please see the enclosed Site Maps and Plan of Borings found in *Appendix A* for the specific location of the project site. The proposed project includes the installation of approximately 11,440 linear feet of waterline and the installation of two pressure reducing valves using horizontal directional drilling (HDD) and/or jack and boring techniques. If these assumptions are not correct, please contact the geotechnical engineer so they may review the recommendations contained herein for accuracy, completeness, and appropriateness.

#### **FIELD INVESTIGATION**

Eleven borings were drilled to various depths spaced at locations as shown on the enclosed Logs of Boring and Plan of Borings using a truck-mounted drilling rig. Field testing was performed on site and representative samples were recovered for laboratory testing. Blow counts, via standard penetration test, were taken where possible. Where rock material was encountered, coring was performed using a coring rig.

#### LABORATORY INVESTIGATION

Representative soil samples were selected for laboratory index tests including moisture content, dry unit weight, Atterberg Limits, triaxial shear, unconfined compressive strength of rock cores, swell pressure, slake durability, and grain size distribution. Grain size distribution (GSD) was performed by utilizing the 3/8", #4, #10, #40, #100, and #200 standard sieves as well as hydrometer to analyze particle sizes finer than the #200 sieve. The results of the GSD are presented as the percent finer than, by weight, each grain size. The results of these tests and stratigraphy are presented on **Table 1** and **Table 2** beginning on pages 8 and 13 respectively and the Logs of Boring found in *Appendix A*. A key to the Soil Classification and symbols is located

behind the last Log of Boring. See *Appendix B* for details of field and laboratory procedures, as applicable.

#### SITE TOPOGRAPHY

The site consists of four creek crossings along US 290 and Springdale Road in east Austin, Texas. The four workspaces are all located in variably sloping areas with slopes ranging from approximately 6 to 14 percent. The pre-developed vegetation at this site included open areas of native grasses and areas of dense vegetation with mature trees near the creeks.

# **GEOLOGIC CONDITIONS** (1,2,3)

#### Regional

Austin is located in parts of the Edwards Plateau, Rolling Prairie, Blackland Prairie, and the Colorado River Terraces. Each of these regions has a distinct topographic profile. The topography is a function of the geologic formations underlying each region. The Balcones Fault Zone, that trends northeast-southwest, is the controlling geologic structure of the Austin area. West of the Balcones Fault, the Edwards Plateau is encountered in the northwest third of Austin. East of the Balcones Fault, the Rolling Prairie is encountered in the central third of Austin. The Rolling Prairie gives way to the Blackland Prairie in the far southeast third section of Austin. The Colorado River Terraces lie along Austin tributaries and cover much of central and east Austin. The faulting associated with the Balcones Fault Zone occurs within a relatively narrow region of central Austin. This region is to the west of the project site. This site is located on the Blackland Prairie Region, which does not typically contain geologic faulting. Faulted conditions were not encountered during the drilling portion of this investigation and local geology maps do not indicate the presence of faults in the vicinity. As such, variable subsurface conditions due to geologic faulting are not expected at this site.

## **Local Geology**

Geologic maps indicate tributary terrace deposits, *Qtt*, alluvium deposits, *Qal*, and the Taylor Group, *Kta*, beneath the subject site. Additionally the soil properties noted in the borings indicate the presence of the Austin Group, *Kau*. A description of each geology follows.

The tributary terrace deposits, *Qtt*, were formed by base flow and flooding of tributaries of an ancient Colorado River that drained much of Central Texas during the Quaternary Period, beginning about 10,000 years ago. These terrace deposits generally consist of high and low plasticity clay and sand with gravel layers. The proportion of sand and clay in these deposits was dependent on the depositional energies of these sediments. During periods of flooding, gravel layers were deposited and, as the floods receded, sands and clays were deposited. Generally, the older or lower portions of this formation are comprised of large materials such as sand and gravel. The more recent or upper portions of this terrace deposit consist primarily of clay with fine sand and occasionally fine gravel layers. This formation was also subject to periods of drought. These droughts lowered the water table in the sediments, which resulted in the deposition of calcareous material called evaporite. More recent alluvial material consisting of high plasticity clay overlies this formation, but is often not mapped separately.

The alluvium deposits, *Qal*, are of fluvial origin and consist primarily of clay with variable amounts of sand and silt with occasional gravel layers. These deposits are part of the floodplain of the Colorado River and its tributaries. They are characterized as consisting of an upper zone of clay soil underlain by increasingly sandy clay soil that varies to clayey sand. These soils often vary from dark brown at the surface and become lighter brown, occasionally reddish brown, with depth. Alluvium can store and transmit ground water, particularly through their gravel layers and along the surface of limestone bedrock, where present.

The Taylor Group, *Kta*, is characterized by dark brown to dark gray and blue gray, montmorillonitic clay. The Taylor formation in the unweathered state is usually hard, dry shale. Within a 30 to 70 foot surficial zone, weathering usually forms a high plasticity, mottled light

brown and light gray tan with reddish and yellowish brown seams. Thin layers of quartz and calcareous siltstone are common. Layers of soft calcium and other readily soluble minerals left behind from evaporation processes are common in the upper part. The consistency of the Taylor material ranges from medium to hard and is generally not troublesome with regard to bearing capacity or long-term settlement for light structures placed on it. Because of the sand layers and the clay composition of this formation, it is highly susceptible to significant lateral moisture penetration under foundations resulting in extensive volume changes with varying soil water contents. Structures built on this formation without proper consideration of these effects often undergo significant movement resulting in damage to the structure.

In normal geologic sequence, the Austin Group, *Kau*, is overlain by the Taylor Group and underlain by the Eagle Ford Formation (of the Woodbine Group). These groups are all from the Gulf Series. The Austin Group is composed of seven fairly distinct member formations, but can be generally described as follows. The Austin is composed of alternating, thick to thin beds of chalky limestone and calcareous clays. The near surface weathered limestone and marls are white and light yellowish brown, respectively. Reddish brown streaks caused by pyrite inclusions are often encountered on freshly exposed chalky limestone surfaces. Both limestone and marl are dark gray to very dark gray in their un-weathered state usually found at great depths. Fossils such as *Inocerami* are often on freshly exposed surfaces. Full sections may range up to 420 feet in thickness although specific locations may be significantly different. Some parts of the Austin Group are stable hard rock, other parts are made up of calcareous clays that can shrink and swell.

#### SUBSURFACE CONDITIONS AND SITE SPECIFIC GEOLOGY

#### **Terrace and Alluvium Deposits**

The tributary terrace deposits, *Qtt*, and alluvium deposits, *Qal*, were encountered in each boring. These deposits typically consist of high to low plasticity clay (CH to CL) with sand and gravel. Layers of clayey sand (SC) where noted in the borings.

On this site, these clay and sand layers were typically encountered at the surface to the depth of the Taylor Group which was encountered at varying depths ranging from 4 feet to 27 feet. Please see the enclosed Logs of Boring in *Appendix A* for a detailed description of the layers encountered and their depths.

The results of the field investigation and the laboratory test results are presented in **Table 1.** Please see the enclosed Logs of Borings in *Appendix A* for detailed descriptions of the subsurface conditions. A key to the Soil Classification and symbols is located behind the last Log of Boring. See *Appendix B* for details of field and laboratory procedures, as applicable.

#### **Taylor Group**

The Taylor Group underlies the terrace deposits at this site and was encountered in all of the borings. The Taylor Group at this site is typically comprised of yellowish tan and light gray high plasticity (CH) clay that varies to dark gray at depth, weathered shale, and intact shale.

On this site, the intact shale exhibited a standard core recovery (SCR) percentage ranging from 60 to 100 and a rock quality designation (RQD) ranging from 0 to 100. The unconfined compressive strength tests performed on representative core samples range from 61 to 236 tons per square foot (tsf). The slake durability tests performed on representative core samples range from 53 to 82 percent.

The results of the field investigation and the laboratory test results are presented in **Table 1** and **Table 2.** Please see the enclosed Logs of Borings in *Appendix A* for detailed descriptions of the subsurface conditions. A key to the Soil Classification and symbols is located behind the last Log of Boring. See *Appendix B* for details of field and laboratory procedures, as applicable.

#### **Austin Group**

The Austin Group was encountered in borings B-22A, B-23A, B-24A, B-25A, B-25B, B-26A, B-27A, and B-29A at depths ranging from 30 feet to 66 feet below the ground surface. The

Austin Group typically consists of a fossiliferous gray to light gray limestone. The intact limestone is typically a moderately weak to strong limestone with good core recovery.

On this site, the intact limestone exhibited a SCR percentage ranging from 57 to 100 and a RQD ranging from 23 to 100. The unconfined compressive strength tests performed on representative core samples range from 43 to 248 tons per square foot (tsf). The slake durability tests performed on a representative core sample was 89 percent.

The results of the field investigation and the laboratory test results are presented in **Table 1** and **Table 2.** Please see the enclosed Logs of Borings in *Appendix A* for detailed descriptions of the subsurface conditions. A key to the Soil Classification and symbols is located behind the last Log of Boring. See *Appendix B* for details of field and laboratory procedures, as applicable.

Springdale Road/US 290 Water Improvements Engineer's Job No.:14106090.002

		-2μm <sup>12</sup>			49								99				21						
	ι	-#200			94								95				50						
	Grain Size Distribution (% passing) <sup>11</sup>	-#100			96								26				58						
	n Size Distribu (% passing) <sup>11</sup>	-#40			26								86				75						
	rain Si (%	-#10			66								66				96						
	9	-#4			100								100				100						
esults		-3/8"			100								100				100						
Table 1: Laboratory and Field Test Results	$q_{\alpha}$	(psf) <sup>10</sup>	1,300		6,900							7,900	14,600			12,700	14,100						
ıd Fiel		PI <sup>9</sup>			22								36				23						
ory an		LL <sup>8</sup>			63								64				40						
borat		l Pressure (psf) <sup>7</sup>		550													40						
: 1: La	γor	$\gamma_d (pcf)^6$	92		105	124			132			26	106	126	127	116	121					133	127
Table		loisture tent (%) <sup>5</sup>	42	22	20							26	19			13	10						
	q	$_{u}\left( \mathrm{tsf}\right) ^{4}$				160			193					61	189							154	248
	$I_d$	(2) (%) <sup>3</sup>					53	77															
	N	-value <sup>2</sup>								24	9							6	18	12	50(5")		
		USCS sification <sup>1</sup>	СН	СН	CH					HD	CH	CH	HD			CH	SC	SC	CF	CT	HD		
	_ <del></del> ]	Depth	7.	19'	24'	26,	30,	40,	54,	3,	5,	161	24'	.98	44,	,6	14'	.61	24,	29,	34,	37,	41,
	I	Boring	B-22A							B-22B						B-23A							

&-

Springdale Road/US 290 Water Improvements Engineer's Job No.:14106090.002

		-2μm <sup>12</sup>		50					62										65						49
	u	-#200		85					26										96						82
	Grain Size Distribution (% passing) <sup>11</sup>	-#100		68					86										26						98
	n Size Distribu (% passing) <sup>11</sup>	-#40		16					66										86						86
	rain Si (%)	-#10		26					66										86						95
(pai	5	-#4		100					100										100						66
continu		-3/8"		100					100										100						100
e 1: Laboratory and Field Test Results (continued)	$q_c$	(psf) <sup>10</sup>																6,900	12,600					5,300	11,500
l Test		PI <sup>9</sup>		43					46										38						35
Field		LL <sup>8</sup>		9					74										63						27
ory and		l Pressure (psf) <sup>7</sup>																							1,310
aborat	γor	$\gamma_d (pcf)^6$						103	105	125		129						111	103		126	127		105	105
e 1: L		loisture tent (%) <sup>5</sup>		14				22	20									14	23					21	21
Table		$_{u}\left( \mathrm{tsf}\right) ^{4}$								168		128									163	202			
	$I_d$	(2) (%) <sup>3</sup>									89														
	N	-value <sup>2</sup>	15	39	22	44	48	44	92				4	13	7	5	5	24	36	50(1")			7		
		USCS sification <sup>1</sup>	СН	CH	CH	CH	CH	CH	CH				CH	CH	CH	CH	CH	CH	CH				CH	CH	СН
	]	Depth	1,	3'	5,	7,	9,	14'	19'	29,	30,	36,	1,	3,	5,	7,	9,	14,	19,	24,	29,	32,	1,	9,	14,
	F	Boring	B-24A										B-25A										B-25B		

-6-

Springdale Road/US 290 Water Improvements Engineer's Job No.:14106090.002

Γ			1	1		1																	- 1	<del></del>
		-2μm <sup>12</sup>									20										25	18	37	
	u	-#200									93										89	43	77	
	Grain Size Distribution (% passing) <sup>11</sup>	-#100									96										81	51	68	
	n Size Distrib (% passing) <sup>11</sup>	-#40									86										96	73	96	
	rain S (%)	-#10									66										66	66	86	
(pen	0	-#4									100										100	100	100	
(contin		-3/8"									100										100	100	100	
1: Laboratory and Field Test Results (continued)	$q_{\alpha}$	(psf) <sup>10</sup>						5,700		4,400							5,600				3,800			
l Test		PI <sup>9</sup>									34										17	16	21	
Field		LL <sup>8</sup>									53										34	32	37	
ory and		l Pressure (psf) <sup>7</sup>								360											100			
borate		$\gamma_d (pcf)^6$		133		138		108		101			128		127		109				111			
	M Con	loisture tent (%) <sup>5</sup>						18	22	21	13						14				16	25	16	
Table	q	$_{u}$ (tsf) <sup>4</sup>		210		236							85		196									
•	$I_d$	(2) (%) <sup>3</sup>			82									68										
-	N	-value <sup>2</sup>	50(3")				13				50(4")	50(3")				10		2	6	2		7	50(6")	50(4")
-	Clas	USCS sification <sup>1</sup>	НЭ				СН	CH	СН	CH	CH					СН	CH	CH	CH	$C\Gamma$	$C\Gamma$	SC	CF	CL
	]	Depth	19,	24,	25,	34,	3,	7,	14,	19,	24,	29,	31,	35,	44,	1,	3,	7,	9,	14,	19'	24'	29'	34,
-	I	Boring	B-25B				B-26A									B-27A								

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Springdale Road/US 290 Water Improvements Engineer's Job No.:14106090.002

		-2μm <sup>12</sup>								52									59					37	
	n	-#200								06									95					83	
	Grain Size Distribution (% passing) <sup>11</sup>	-#100								94									86					91	
		-#40								96									86					26	
		-#10								86									66					86	
(par	9	-#4								66									100					100	
continu		-3/8"								100									100					100	
1: Laboratory and Field Test Results (continued)	$q_{\alpha}$	, (psf) <sup>10</sup>								21,300	18,300							21,100	12,800					6,200	7,800
l Test	PI <sup>9</sup>									40									40					28	
Field	LL <sup>8</sup>									61									99					46	
ory and	Swell Pressure (psf) <sup>7</sup>																		1,310						
aborat	γor	$\gamma_d (pcf)^6$	125	124						109	103		139	130				119	105	124	130			110	26
e 1: L	M Con	loisture tent (%) <sup>5</sup>								18	22							14	23					19	27
Table	q	$u (tsf)^4$	212	43									143	176						102	121				
	$I_d$	(2) (%) <sup>3</sup>																							
	N	-value <sup>2</sup>			54	10	13	21	18			50(6")			8	6	11					12	36		
		USCS sification <sup>1</sup>			$C\Gamma$	$C\Gamma$	$C\Gamma$	$C\Gamma$	$C\Gamma$	CH	CH				CH	CH	CH	CH	СН			CH	CH	CT	CH
	]	Depth	38,	42,	1,	3,	5,	7,	9,	19,	24,	29,	32,	38,	2,	4,	7,	14,	19,	30,	37,	2,	9,	14,	19,
	I	Boring	B-27A		B-28A										B-29A							B-29B			

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Springdale Road/US 290 Water Improvements Engineer's Job No.:14106090.002

		-2μm <sup>12</sup>				
	ι	-#200				
	ributior g) <sup>11</sup>	-#100				
	Grain Size Distribution (% passing) <sup>11</sup>	-#40				
	Grain Si (%	-#10				
(tinued)	)	-#4				
1: Laboratory and Field Test Results (continued)		-3/8"				
t Resu	$q_c$	(psf) <sup>10</sup>				
d Test		PI <sup>9</sup>				
d Fie		LL <sup>8</sup>				
ory ar		l Pressure (psf) <sup>7</sup>				
aborat	γor	$\gamma_d  (\text{pcf})^6$			123	124
le 1: L		loisture tent (%) <sup>5</sup>				
Table		$_{u}$ $(tsf)^{4}$			107	154
	$I_d$	(2) (%) <sup>3</sup>		<i>LS</i>		
	N	-value <sup>2</sup>	69			
		USCS sification <sup>1</sup>				
	]	Depth	24,	25,	34,	39,
	I	Boring	B-29B			

# Notes:

- 1. Unified Soil Classification System
- 2. N-value blows per foot from standard penetration test (depth of penetration after 50 blows)
- 3.  $I_d(2)$  the percent of material retained after 2 cycles of the slake durability test
- 4.  $q_u$  unconfined compressive strength in tons per square foot
- 5. Moisture Content the percent of water of the dry weight of a sample
- 6.  $\gamma$  or  $\gamma_d$  unit weight of rock or dry unit weight (bulk density) of soil in pounds per cubic foot
  - 7. Swell Pressure the pressure required to prevent swell in pounds per square foot
    - 8. LL liquid limit as determined by Atterberg Limits test 9. PI plasticity index as determined by Atterberg Limits test; NP = Non-Plastic
- 10.  $q_c$  confined compressive strength in pounds per square foot
- 11. Grain Size Distribution (% passing) the percentage by weight of a sample that passes through each sieve.
- 12. -2μm the percentage of material with a particle diameter of less than 2 micrometers as determined by the hydrometer sedimentation test.

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Table 2: Rock Mass Characteristics

		Table 2: Rock				
Boring	Depth of Run	SCR (RQD) <sup>1</sup>				
B-22A	25' to 30'	73 (40)				
	30' to 35'	100 (67)				
	35' to 40'	87 (87)				
	40' to 45'	100 (70)				
	45' to 47'	100 (0)				
	48' to 50'	100 (42)				
	50' to 55'	92 (77)				
	55' to 60'	88 (88)				
B-22B	25' to 30'	100 (0)				
	30' to 35'	100 (54)				
	35' to 40'	100 (64)				
	40' to 45'	100 (90)				
	45' to 50'	75 (67)				
	50' to 55'	90 (72)				
	55' to 60'	67 (63)				
B-23A	35' to 40'	83 (31)				
	40' to 45'	100 (32)				
	45' to 50'	90 (29)				
	50' to 55'	91 (91)				
	55' to 60'	72 (23)				
B-24A	20' to 25'	79 (79)				
	25' to 30'	85 (45)				
	30' to 35'	100 (100)				
	35' to 40'	100 (100)				
	40' to 45'	100 (100)				
	45' to 50'	100 (100)				
	50' to 55'	100 (100)				
	55' to 60'	97 (97)				
	60' to 65'	90 (90)				
	65' to 70'	86 (80)				
B-25A	25' to 30'	77 (70)				
	30' to 35'	100 (80)				
	35' to 40'	100 (100)				
	40' to 45'	100 (100)				
	45' to 50'	60 (60)				
B-25B	20' to 25'	88 (75)				
	25' to 30'	87 (87)				

Boring	Depth of Run	SCR (RQD) <sup>1</sup>
B-25B	30' to 35'	60 (52)
	35' to 40'	95 (90)
	40' to 45'	100 (100)
	45' to 50'	57 (57)
	50' to 55'	100 (100)
	55' to 60'	82 (78)
B-26A	30' to 35'	100 (100)
	35' to 40'	98 (98)
	40' to 45'	100 (100)
	45' to 50'	100 (100)
	50' to 55'	100 (100)
	55' to 60'	100 (100)
	60' to 65'	100 (100)
	65' to 70'	88 (88)
	70' to 75'	100 (90)
B-27A	35' to 40'	71 (71)
	40' to 45'	100 (100)
	45' to 50'	100 (88)
	50' to 55'	87 (82)
	55' to 60'	98 (98)
	60' to 65'	100 (80)
	65' to 70'	94 (94)
	70' to 75'	87 (78)
B-28A	30' to 35'	97 (88)
	35' to 40'	100 (100)
	40' to 45'	97 (90)
	45' to 50'	100 (90)
B-29A	30' to 35'	88 (75)
	35' to 40'	95 (68)
	40' to 45'	95 (60)
	45' to 50'	97 (78)
B-29B	25' to 30'	100 (90)
	30' to 35'	98 (96)
	35' to 40'	95 (90)
	40' to 45'	93 (75)
	45' to 50'	92 (92)

## Notes:

1. Standard Core Recovery (Rock Quality Designation)

#### **Faults**

Published geology maps do not indicate the presence of a fault on the project site and faulted conditions were not observed in the boring samples.

#### **Ground Water**

Ground water was observed in borings B-23A and B-27A during this investigation. Additionally, ground water was monitored by ECS Texas, LLP in a separate investigation. In the month of April 2014, ECS Texas, LLP noted ground water at each of the crossings at depths ranging from approximately 7 feet to 27 feet below the ground surface.

#### **REFERENCES**

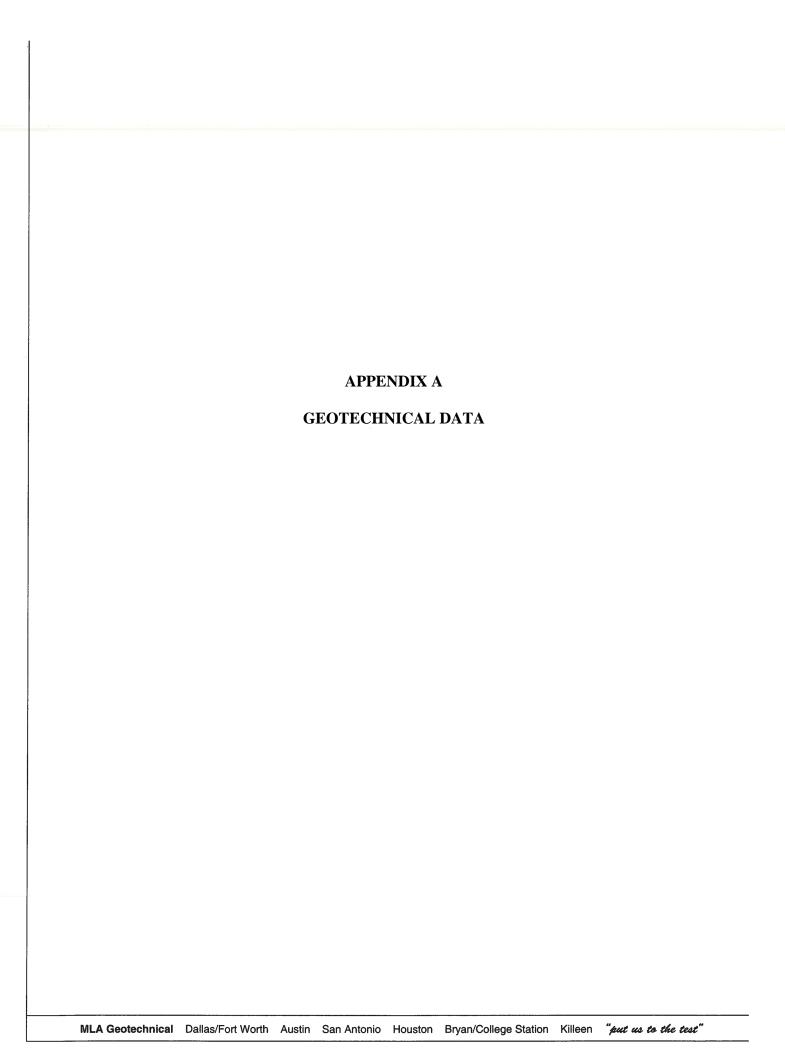
- 1. Local geologic maps published by The Bureau of Economic Geology. Austin, Texas including:
  - "Geologic Atlas of Texas" 15-minute quadrangles. March 9, 2004 geospatial data.
  - "Geologic Map of the Austin Area, Texas 1992" Geology of Austin Area Plate VII.
  - "Geologic Map of the West Half of Taylor Texas, 30 x 60 min quad." 2005. misc. map 43
  - "Geologic Map of the New Braunfels, Texas 30 x 60 min quad" 2000. misc. map 39
- 2. "The Geology of Texas, Volume I, Stratigraphy", The University of Texas Bulletin No. 3232: August 22, 1932, The University of Texas, Austin, Texas, 1981.
- 3. Garner, L.E., and K.P. Young, "Environmental Geology of the Austin Area: An Aid to Urban Planning", The University of Texas at Austin, Bureau of Economic Geology, 1976

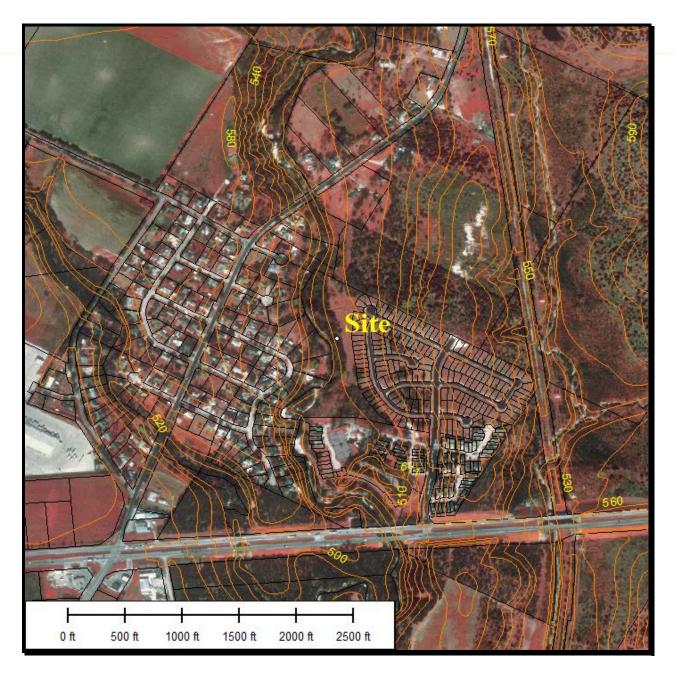
#### LIMITATIONS OF REPORT

The conditions of the site at locations other than the boring locations are not expressed or implied and conditions may be different at different times from the time of borings. Contractors or others desiring more information are advised to secure their own supplemental borings. This investigation and report, do not, and are not intended to determine the environmental conditions or evaluate possible hazardous or toxic waste conditions on this site or adjacent sites. Interested persons requiring this information are advised to contact MLA Labs, Inc.

The analysis and recommendations contained herein are based on the available data as shown in this report and the writer's professional expertise, experience and training, and no other warranty is expressed or implied concerning the satisfactory use of these recommendations or data.

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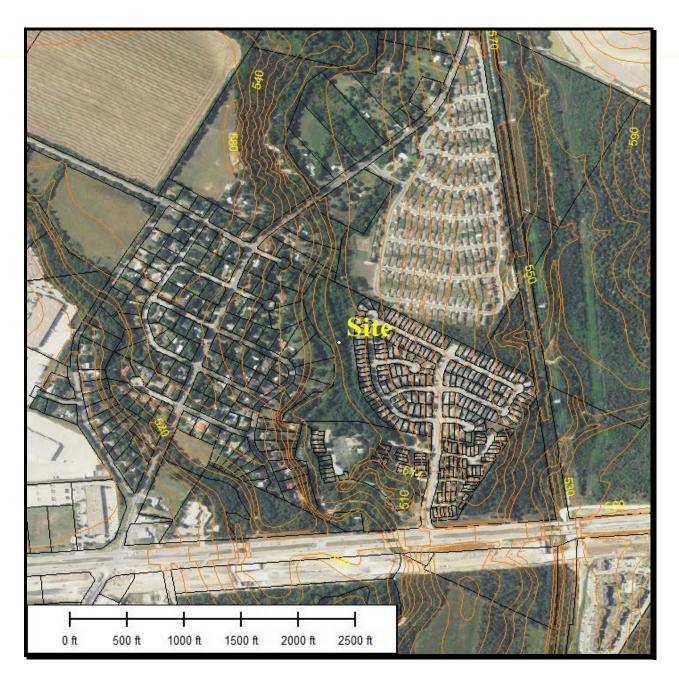


Approximate location of site in yellow CAPCOG contours (2008) in orange TCAD parcels (2010) in black

# NAPP Aerial Photograph of Site – 1995

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM 3.75-minute DOQQ. 1-meter ground resolution. apx. date 1995-6 (http://www.tnris.state.tx.us/digital.htm)



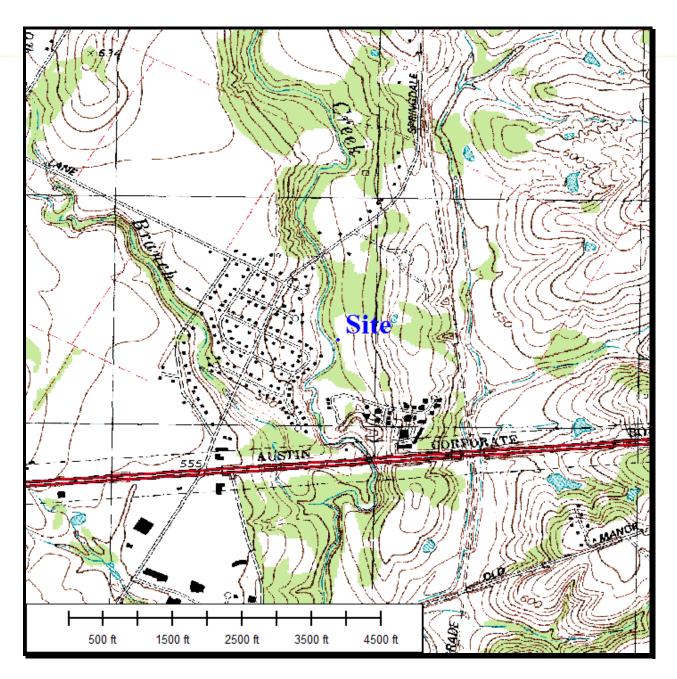


Approximate location of site in yellow CAPCOG contours (2008) in orange TCAD parcels (2010) in black

# $Aerial\ Photograph\ of\ Site-2012$

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM
Apx. Date - 2012
(ftp://ftp2.tnris.org/NAIPCCMs/12/)



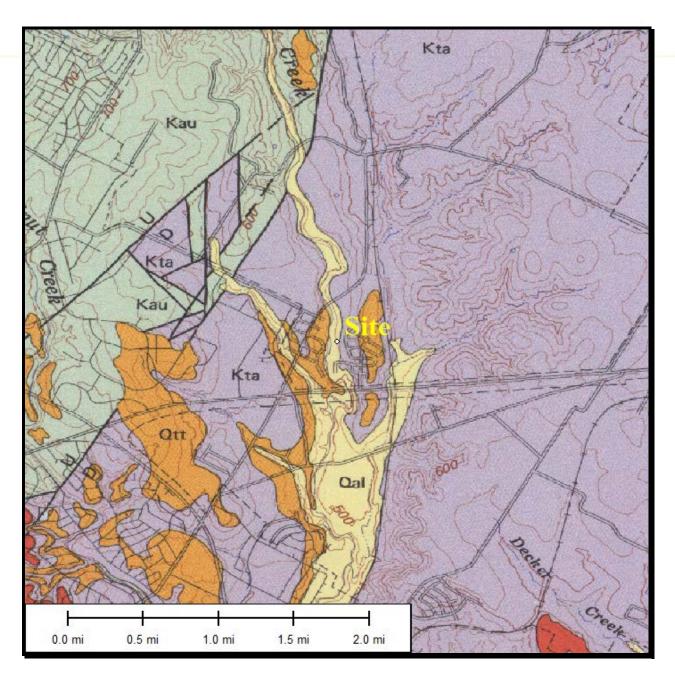


Approximate location of site in blue

## U.S. 7.5 Minute Series Topographic Map Austin East Quadrangle, Texas Contour Interval = 10 feet

Source: TEXAS NATURAL RESOURCES INFORMATION SYSTEM (http://www.tnris.state.tx.us/digital.htm)



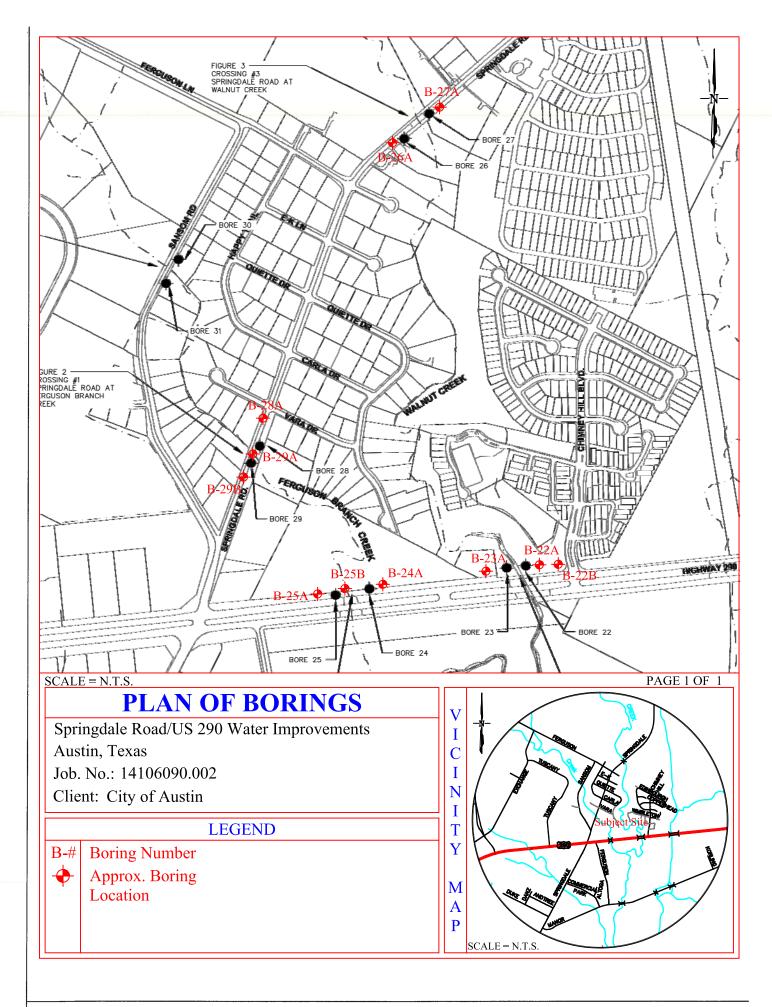


Approximate location of site in yellow

## Geologic Setting of Site Geologic Map of the Austin Area, Texas 1992 Contour Interval = 20 feet

Source: Bureau of Economic Geology, The University of Texas at Austin, Plate VII







Job Name: Springdale Road/US 290 Water Improvements

**Boring B-22A** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

Hole Size: 4.5 in.

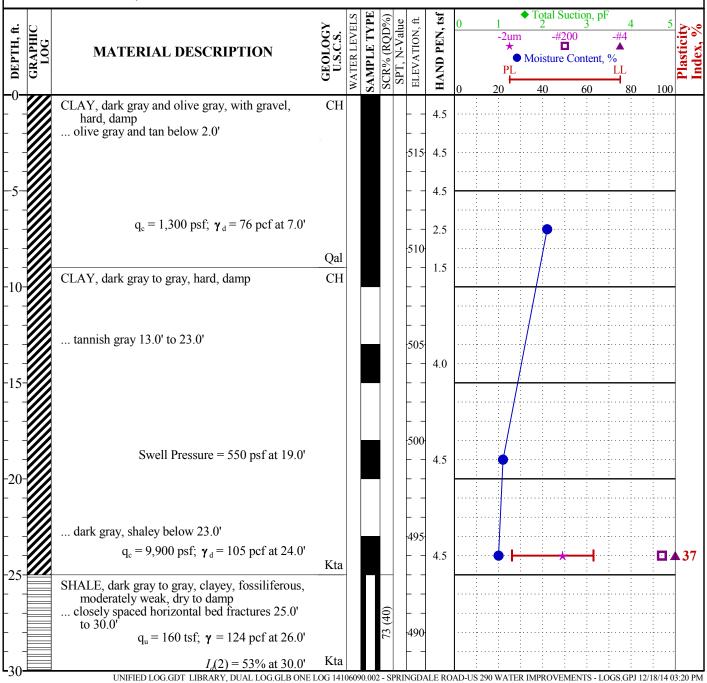
Drill Date: September 29, 2014 **Ground Elevation:** 518 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

AT END OF DRILLING: ---

Rig: **Notes:** GPS: N 30.32964°; W 97.64798° AFTER DRILLING: ---







Job Name: Springdale Road/US 290 Water Improvements

Boring B-22A PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

H, ft.		_					#	_	0	1		,	- 3	- 4		51 ⊾
DEPTH, ft. GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	ELEVATION,	HAND PEN, tsf	0	PL	Moi	-#2( sture (	Conte	LL		Plasticity
335-	SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp (continued) vertical fracture at 30.5' highly weathered at 33.0' closely spaced horizontal bed fractures 33.0' to 39.0' vertical scarring 35.0' to 40.0'	*	Λ	S	87 (87) 100 (67) S	- -4 - -	- - - - - - - - - - - - - - - - - - -	<u> </u>		 20	4	0	60	80	10	
40	$I_d(2) = 77\%$ at 40.0' moderately weathered 40.5' to 41.0' pitted 41.4' to 44.3'  moderately weathered 44.3' to 45' very closely spaced horizontal bed fractures 45.0' to 47.0'	<b>V</b>			2) 100 (0) 100 (70)	-	- - - 1.775 - - - - 1.770									
50-	LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry closely spaced horizontal bed fractures 49.0' to 56' $q_u = 193 \text{ tsf}; \; \gamma = 132 \text{ pcf at } 54.0'$ moderately spaced horizontal bed fractures below 56.0'	Kta			88 (88)   92 (77)   100 (42)	  -  -  -  -  -  -	- - - - - - - -									
50	Bottom of hole at 60.0 feet.	Kau			88	4	-									



Job Name: Springdale Road/US 290 Water Improvements

**Boring B-22B** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

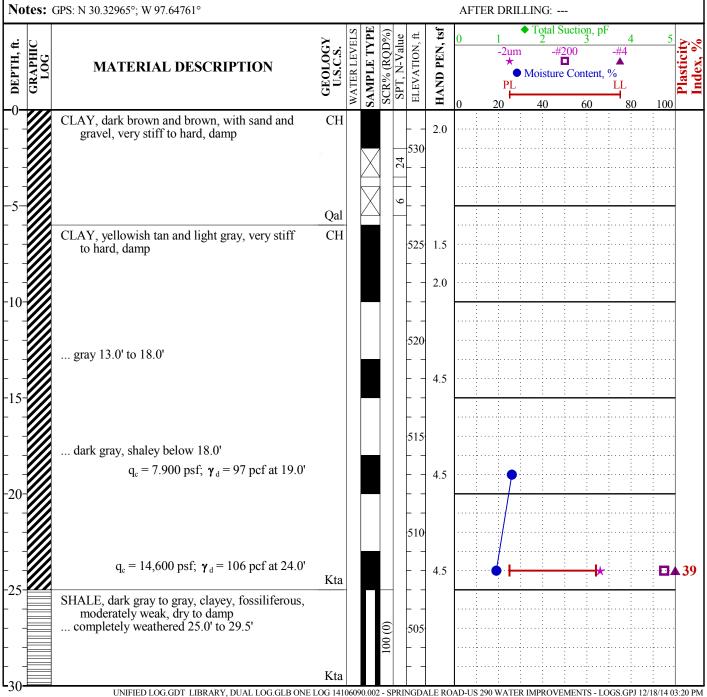
Hole Size: 4.5 in.

Drill Date: September 29, 2014 **Ground Elevation:** 532 ft **Ground Water Levels:** 

AT TIME OF DRILLING: ---

AT END OF DRILLING: ---

Rig:







Job Name: Springdale Road/US 290 Water Improvements

Boring B-22B PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

	ent:	City of Austin		7.0	丘			<b>J</b>				◆ Total	Suction	nF		
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SF1, IN- value ELEVATION, ft.	HAND PEN, tsf	0		<u>-</u> 2um ★	1 -	#200 re Conte	-#4 •	5	Plasticity Index %
-30-				W	$\mathbf{S}_{\mathbf{A}}$	S	a 🖫	H	0	. 2	20	40	60	. 80	100	1
 		SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp <i>(continued)</i> closely spaced horizontal bed fractures below 30.0'				100 (54)	500	)• -								
-35-  		$q_u = 61 \text{ tsf; } \gamma = 126 \text{ pcf at } 36.0'$ slighty weathered, pitted 36.4' to 40.0'				100 (64)	495	5,								
-40- -40-		vertical scarring 40.0' to 41.0'														
  -45-		$q_{\rm u} = 189 \; {\rm tsf}; \; \gamma = 127 \; pcf \; at \; 44.0'$ slightly weathered 44.5'				100 (90)	- 490  	) <del>;</del> - -								
 						75 (67)	485	5,								
-50-  		vertical scarring 50.0' to 51.0'				90 (72)	480	- - )•								
 -55- 						6										
 			Kta			67 (63)	475	<del>,</del>								
-60-		Bottom of hole at 60.0 feet.	Nia													
															:	





Job Name: Springdale Road/US 290 Water Improvements

**Boring B-23A** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

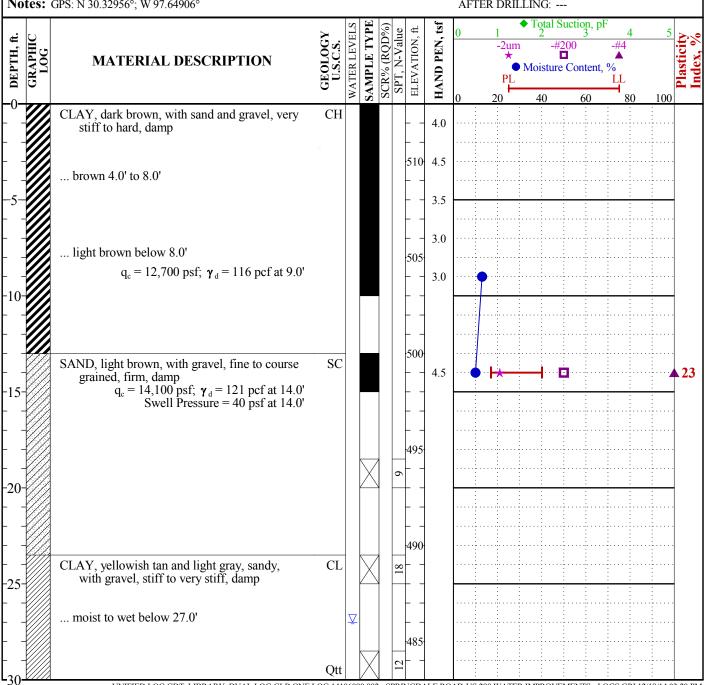
Client: City of Austin

Hole Size: 4.5 in.

**Drill Date:** October 1, 2014 **Ground Elevation:** 513 ft **Ground Water Levels:** 

✓ AT TIME OF DRILLING: 27.0 ft / Elev 486.0 ft

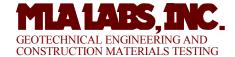
Rig: AT END OF DRILLING: ---**Notes:** GPS: N 30.32956°; W 97.64906° AFTER DRILLING: ---







Jol En	o Lo gine	me: Springdale Road/US 290 Water Improvements cation: Austin, Texas er's Job #: 14106090.002 City of Austin		<b>D</b> '				<b>G</b> -				Bor	i <b>ng F</b> PAGI	<b>B-23</b> AE 2 OF	2
OEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION  MATERIAL DESCRIPTION	WATER LEVELS	SAMPLE TYPE	SCR% (ROD%)	SPT, N-Value	ELEVATION, ft.	HAND PEN, tsf	0	1 -2ur * PL 20	m Mois	3	-#4 	100	Plasticity Index, %
 		CLAY, yellowish tan and light gray, sandy, with gravel, stiff to very stiff, damp (continued)  Qt	t			1 1	  480								
-35-		CLAY, gray, with trace sand and gravel, hard, damp to moist  LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry	H a			50(5")	  								
  -40-		closely spaced horizontal bed fractures 35.0' to 40.0'  mottled, slightly weathered 35.0' to 36.3'  moderately weathered, shaley 36.3' to 37.0'  q <sub>u</sub> = 154 tsf; γ = 133 pcf at 37.0'  mottled, slightly weathered 37.0' to 40.0'  very closely spaced horizontal bed fractures			83 (31)		 475 <sup>.</sup>  								
  -45-		40.0' to 44.0' $q_u = 248 \text{ tsf}; \; \pmb{\gamma} = 127 \text{ pcf at } 41.0'$ highly weathered, with very close fractures 44.0' to 47.0'			100 (32)		 470  								
   		closely spaced horizontal bed fractures 47.0' to 59.0'			90 (29)		  465 <sup>.</sup> 								
-50-  					91 (91)		  460·								
-55-  					72 (23)		  455					: : : : : : : :			
-60-		highly weathered below 59.0'  Kan  Bottom of hole at 60.0 feet.	1				 			:		:		<u>:</u>	<u>.</u>



Job Name: Springdale Road/US 290 Water Improvements

Boring B-24A
PAGE 1 OF 3

"put us to the test"

Killeen

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

Hole Size: 4.5 in.

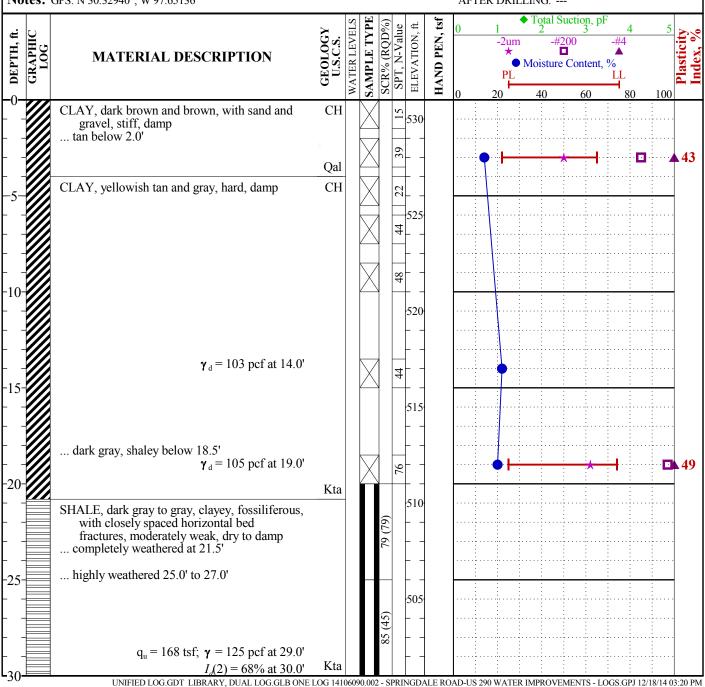
**Drill Date:** October 1, 2014 **Ground Elevation:** 531 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

**Rig:**Notes: GPS: N 30.32940°; W 97.65136°

AT END OF DRILLING: ---



MLA Geotechnical Dallas/Fort Worth Austin San Antonio Houston Bryan/College Station



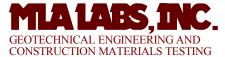
# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-24A PAGE 2 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Cli	ient:	City of Austin																
ft.	ıc		č.	VELS	<b>TYPE</b>	(%Qi	alue N #	N, tsf	0		-2um		otal Si	uction 3	n, pF	<u>4</u> -#4	5	ity %
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	HAND PEN, tsf			*		isture	200 Cont	ent, '	<b>^</b> %		Plasticity Index, %
			AB D	WATI	SAM	SCR9	SPI FIFE	HAN	0	20	PL		10	60		LL 80	100	Pla In
-30		SHALE, dark gray to gray, clayey, fossiliferous,			Ñ		50			<u> </u>		-				30	100	
-		SHALE, dark gray to gray, clayey, fossiliferous, with closely spaced horizontal bed fractures, moderately weak, dry to damp (continued)				.00 (100)	F	-				: : : :						
-		(commuea)				100	$\downarrow$	1		<u>:</u>		: 					· · · · · · · · · · · · · · · · · · ·	
-35							F		:	:								1
-		$q_u = 128 \text{ tsf}; \ \gamma = 129 \text{ pcf at } 36.0'$				()	49	5	<u>:</u> .	<u>:</u> :							<u>i</u>	
						.00 (100)	t										<u>:</u>	
						10	-	-				· · ·						
-40·					П		10	_	:	:		:					<u>:</u> :	-
						(00)	49	0										
-						100 (100)	-	-		<u>:</u> :			:				:	
-45							t	_		:			:				:	
							48	5				:						
-						00 (100)	+	+	ļ <u>.</u>								<u>.</u>	
						100	ļ										:	
-50					H		-	+		:		:	:	: :	:		:	-
						(00	48	0		<u>i</u>								
						.00 (100)	F		ļ <u>.</u>									
						_	+	-		<u>:</u>							:	
-55							47	5.		:		: : :						
-						(62)	ļ.,	-	<u>:</u>			:						
-						) 16	+	-		<u>:</u>							:	
-60							F		:	:								
.							47	0	<u>.</u>			: : :					<u>i</u>	
-						(06) 06	+	_		!							<u>:</u>	
			Kta			6	F											



-LOG OF BORING-**Boring B-24A** Job Name: Springdale Road/US 290 Water Improvements PAGE 3 OF 3 Job Location: Austin, Texas **Engineer's Job #:** 14106090.002 Client: City of Austin ◆ Total Suction, pF WATER LEVELS SAMPLE TYPE SCR% (RQD%) SPT, N-Value HAND PEN, tsf ELEVATION, ft. GEOLOGY U.S.C.S. GRAPHIC LOG -#200 **-**MATERIAL DESCRIPTION Moisture Content, 40 60 100 Kta -65 LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry 8 moderately spaced horizontal bed fractures 65.5' to 67' mottled 65.5' to 68.7' ... closely spaced horizontal bed fractures below Kau Bottom of hole at 70.0 feet.

 $\textbf{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 \ PMR 14 05:20 \ PMR 15 05:20 \ PMR 15 05:20 \ PMR 15 05:20 \ PMR 15 05:20 \ PMR 1$ 



Job Name: Springdale Road/US 290 Water Improvements

**Boring B-25A** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

Hole Size: 4.5 in.

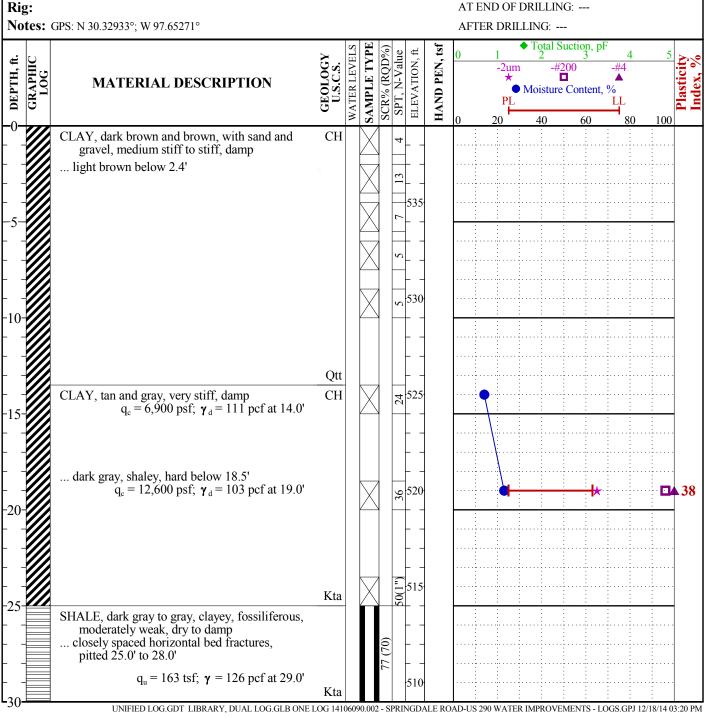
**Drill Date:** September 29, 2014

**Ground Elevation:** 539 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

AT END OF DRILLING: ---





# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-25A PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Cli	ent:	City of Austin													<b>A</b> 7	1		,.		_			
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	ELEVATION, ft.	HAND PEN, tsf	0	)			2um ★	l	otal 2 - oistu	#20	00		-#		5	Plasticity Index. %
-30-				8	$\mathbf{S}_{A}$	S	<i>S</i> <sub>2</sub>	回	Н	0	)		20	)		40		6	0		80	100	
		SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp (continued) very closely spaced horizontal bed fractures, moderately weathered 30.0' to 32.0' $q_u = 202 \text{ tsf}; \; \gamma = 127 \text{ pcf at } 32.0'$ closely spaced horizontal bed fractures 32.0' to 45.0'				100 (80)	.;	  505: 															
						100)		 				: : : :								<u>.</u>			
 40-						100 (100)	:	500		-													
 		vertical scarring 42.5' to 45.0'				(00)		 												: : : : :			
		-				100 (100)	-	 495									:			: : : : :			
-45-		very closely spaced horizontal bed fractures 45.0' to 46.0' closely spaced horizontal bed fractures below								-		<u>:</u>	<u>:</u>		:	<u>:</u>				<u>:</u>		:	
		46.0'	Kta			(09) 09											:			: : : :			
-50-		LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry	Kau			9		490				<u>:</u> :	:				:			<u>:</u> :		:	
		Bottom of hole at 50.0 feet.																					





Job Name: Springdale Road/US 290 Water Improvements

**Boring B-25B** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

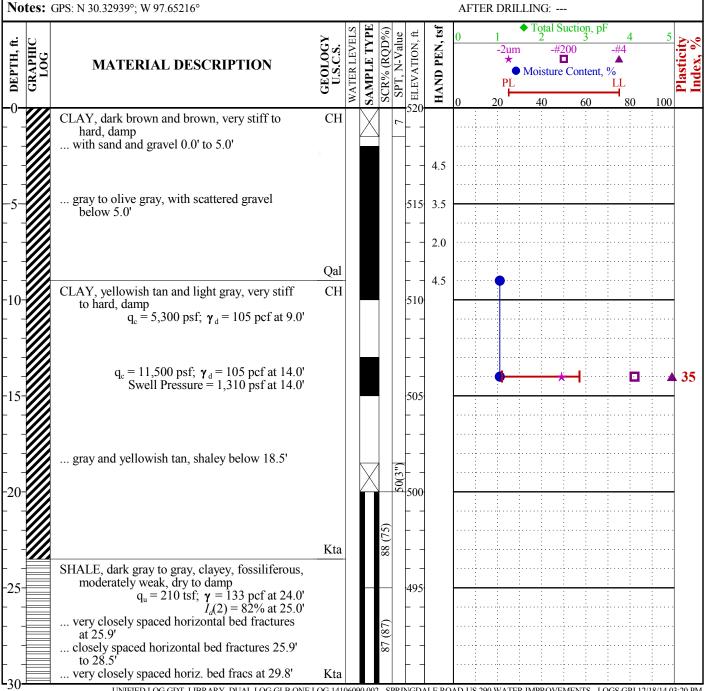
Hole Size: 4.5 in.

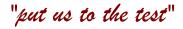
**Drill Date:** September 26, 2014 **Ground Elevation:** 520 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

Rig: AT END OF DRILLING: ---







Job Name: Springdale Road/US 290 Water Improvements

Job Location: Austin, Texas

Boring B-25B PAGE 2 OF 2

<u>:</u>	ွ		7.	ELS	YPE	)%) lue	l, ft.	, tsf	0		1		<b>♦</b> To	tal Si		n, pF		4	5	<b>&gt;</b>
DEPTH, II.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%) SPT, N-Value	ELEVATION, ft	HAND PEN, tsf				2um ★ • PL	Moi	-#2 Esture	1	tent,	-#4 <b>%</b> LL			<b>Plasticity</b>
- 30-				/M	SA	S	년 490	Ή/Η	0	_	20	_	4	0	6	0	<u>8</u>	80	100	
- - - 5-		SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp (continued) closely spaced horizontal bed fractures below 30.0' $q_u = 236 \text{ tsf}; \; \pmb{\gamma} = 138 \text{ pcf at } 34.0'$ LIMESTONE, gray to light gray, fossiliferous,	Kta			60 (52)	   -485													
-		moderately weak, dry moderately spaced horizontal bed fractures 35.0' to 45.0' vertical fractures 38.3' to 39.2'				(06) 56	  													
-0- - - -5-		closely spaced horizontal bed fractures 45.0'				100 (100)	480·   - 475·													-
- - - 0-		to 55.0°				57 (57)	   470													
		vertical fractures 50.5' to 51.0'  moderately spaced horizontal bed fractures				100 (100)	  													
5- - -		55.0' to 57.0' closely spaced horizontal bed fractures 57.0' to 57.5'				82 (78)	- 465   													
)-		Bottom of hole at 60.0 feet.	Kau				460			:	:	:	:	:			<u>:</u> :	:	<u>:</u>	1



Job Name: Springdale Road/US 290 Water Improvements

**Boring B-26A** PAGE 1 OF 3

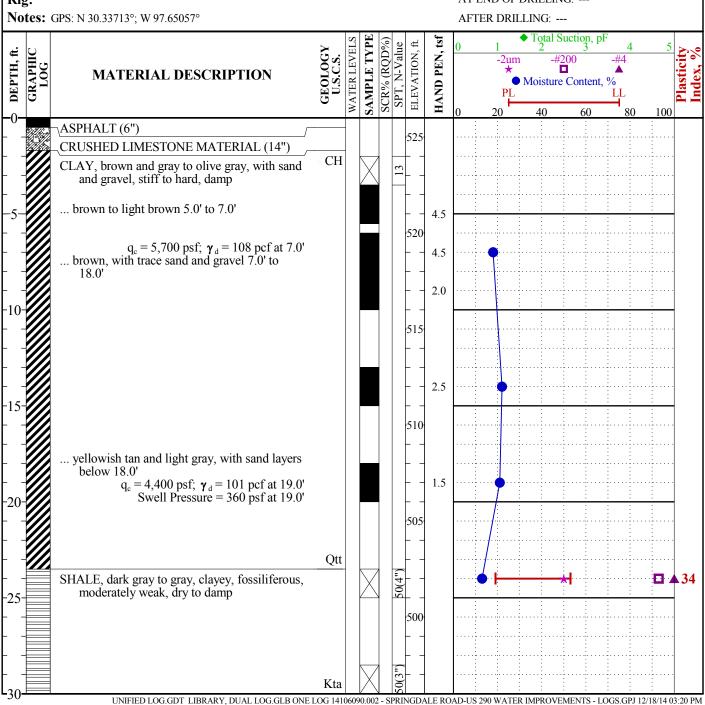
Job Location: Austin, Texas Engineer's Job #: 14106090.002

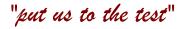
Client: City of Austin

**Drill Date:** October 9, 2014 **Ground Elevation:** 526 ft **Ground Water Levels:** 

AT TIME OF DRILLING: ---Hole Size: 4.5 in.

Rig: AT END OF DRILLING: ---







Job Name: Springdale Road/US 290 Water Improvements

Boring B-26A PAGE 2 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

**Client:** City of Austin

CII	ent:	City of Austin															
ft.	ارد		χ.	/ELS	YPE	D%)	lue	Ä, ft.	HAND PEN, tsf	0	1		2	iction, 1	oF	4	5 2.8
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYP	SCR% (RQD%)	SPT, N-Value	ELEVATION, ft.	PEN		-21	ım	-#2		-#4 •		
DEP	GRA		SEO U.S	\TER	MPI	<b>.</b> R%	PT, 1	EVA	S		P	● Mo L	oisture	Conten	t, % LL		Plastic Index
-30-				W	SA	SC	$\mathbf{S}$	EL	НА	0	20		40	60	8	0 10	
- 	H	LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry						495									
	Ħ	mottled 30.0' to 35.0'				100)	-									<u>.</u>	
	H	mottled 30.0' to 35.0' $q_u = 85 \text{ tsf}; \ \gamma = 128 \text{ pcf at } 31.0'$ closely spaced horizontal bed fractures 31.1' to 33.6'				00(100)				ļ <u>:</u> .					<u>:</u>		
	$\equiv$	to 33.6'				1	-								<u>.</u>		
35	廿	pitted 32.0' to 33.3' $I_d(2) = 89\%$ at 35.0'								:	:	<u>:</u>	: :	<u>:</u>	:	<u>: :</u>	
	廿	vertical fractures, slightly weathered 35.0' to 37.0'						490			<u>i</u>				<u>.</u>		
	井	closely spaced horizontal bed fractures 37.0'				(86)86	-			:	· · · · · · · · · · · · · · · · · · ·		: : : :	:	<u>:</u>	:	
		to 38.5' vertical fractures 38.5' to 38.9'				86				l			• • • • • • • • • • • • • • • • • • • •				
40		closely spaced horizontal bed fractures 40.0'								:	:	:	: :	:	:		
-40- -		to 40.7'						 485		:	:	:	: :	::::	:		
	H					(00									<u>:</u>	: :::	
	井	closely spaced horizontal bed fractures 43.2'				00(100)											
	$\exists$	to $45.0^{\circ}$ $q_u = 196 \text{ tsf}; \ \gamma = 127 \text{ pcf at } 44.0^{\circ}$				1	-								<u>:</u>	<u>.</u>	
45	廿						-			:	:	<u>:</u>	: :	:	<u>:</u>		
	井	closely spaced horizontal bed fractures 46.0' to 47.4'					,	480			<u>i</u>		:		<u>.</u>	: <del>.</del>	
	干	<b>U</b> .,,,				00(100)	-								<u>.</u>		
	$\blacksquare$					100					· · · · · · · · · · · · · · · · · · ·	::::::	: : :		· · · · · · · · · · · · · · · · · · ·		
	$\exists$	mottled, pitted 50.0' to 52.0'					-			l							
50-		mothed, price 20.0 to 22.0						 475		:	:	:	: :	:	:		
	H	moderately spaced horizontal bed fractures				(00		4/3									
	H	52.0' to 60.0'				00(100)									<u>!</u>	: ::	
	世	vertical scarring 63.5' to 65.0'				1(											
-55-										1	:	:	: :	:	:	: :	
	井	with evaporite lenses 56.7' to 59.5'						470									
	干	with evaporite lenses 30.7 to 39.3				(100)	-			<u>:</u>	<u>i</u>			· · · · · · · · · · · · · · · · · · ·	<u>:</u>	: <u>:</u>	
-						100				<u>:</u>	<u>i</u>			<u>:</u>			
		closely spaced horizontal bed fractures,									····:	:		:	· · <del>:</del> · · · · ·	: <u>:</u>	
60-	$\Box$	slighty weathered 60.0' to 63.0'									:	:		:	:	· ·	
						(0		465							:		
		moderately spaced horizontal bed fractures				0(100)		_						:			
		63.0' to 66.0'				100				:				:	:		
		UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE		0.500			Ш			<u> </u>		:				: :	

 $\underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LIBRARY, DUAL LOG.GLB ONE LOG 14106090.002 - SPRINGDALE ROAD-US 290 WATER IMPROVEMENTS - LOGS.GPJ 12/18/14 03:20 PM } \\ \underline{ \text{UNIFIED LOG.GDT LOG$ 



# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-26A PAGE 3 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

		City of Austin		S	闰			÷.			<b>♦</b> T	otal S	uction, p	F		
l, ft.	E E		S.	EVEL	TYP	QD%	ON, ft	IN, ts	0	-2ı	ım	2 -#2	200	<u>4</u> -#4	5	sity %
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	ELEVATION, ft.	HAND PEN, tsf		P	• Mo		Content	, % LL		Plasticity Index. %
	9		Ü	WA	SAN	SCF	ELE	HA	0	20		40	60	80	100	<u>Г</u>
-65-		LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry <i>(continued)</i> mottled 65.0' to 69.0'				-			:	:	:	:			:	1
		mottled 65.0' to 69.0'				8	460									
<u> </u>		closely spaced horizontal bed fractures 66.0' to 68.0'				88 (88)	-			· · · · .			ļ <u>.</u>			
-		alocaly amound howizontal had freetimes helevy					-			<u>.</u>						
-70-		closely spaced horizontal bed fractures below 70.0'					155									1
		moderately weathered, with vertical fractures 71.0' to 72.0'				9	455									
-						100 (90)	-						ļ <u>.</u>			
<u> </u>	$\dashv$		Kau				-			<u>.</u>		-				
-75-		Bottom of hole at 75.0 feet.					† -			:	:					1
									:	:	:	:			:	
											:	:				
									:	:	:					
												•				
									:	:	:				:	
										:	:					
									:		:					
									:	:	:	•			•	
1									:		:	:	: :	: :	:	



Job Name: Springdale Road/US 290 Water Improvements

Boring B-27A
PAGE 1 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

**Drill Date:** October 8, 2014 **Ground Elevation:** 521 ft

**Ground Water Levels:** 

Hole Size: 4.5 in.

✓ AT TIME OF DRILLING: 22.0 ft / Elev 499.0 ft

**Rig:** AT END OF DRILLING: ---**Notes:** GPS: N 30.33771°; W 97.64973° AFTER DRILLING: ---

▼ Total Suction, pI SCR% (RQD%) SPT, N-Value PEN, tsf SAMPLE TYPE WATER LEVELS GEOLOGY U.S.C.S. GRAPHIC LOG ELEVATION, DEPTH, MATERIAL DESCRIPTION HAND] Moisture Content, 20 40 60 100 ASPHALT (7") ≥ 520 CRUSHED LIMESTONE MATERIAL (13") CH CLAY, dark brown, sandy, hard, damp 4.5  $q_c = 5,600 \text{ psf}; \ \gamma_d = 109 \text{ pcf at } 3.0'$ 4.5 .. medium stiff below 6.0' CL CLAY, brown, sandy, medium stiff S 505 ... brown to light brown below 18.0'  $q_c$  = 3,800 psf;  $\gamma_d$  = 111 pcf at 19.0' Swell Pressure = 100 psf at 19.0' 1.0 17 SC SAND, light brown, fine to medium grained, 500 loose, wet 16 Qal CLAY, gray, shaley, hard, moist CL Kta





Job Name: Springdale Road/US 290 Water Improvements

Boring B-27A
PAGE 2 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Cli	ent:	City of Austin																		
į.	С		X.	ELS	YPE	(%(	lue	l, ft.	, tsf	0	1		2	tal Su	3	, pF	4		5	y ⁄0
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	ELEVATION,	HAND PEN, tsf		_	2um ★ PL		-#2( sture (		ent, 9	-#4 % LL			Plasticity Index, %
-30-	(////		CI	*	Š	$\mathbf{x}$	-	E	Ξ	0	20	0	4	0	60		80	1	00	
		CLAY, gray, shaley, hard, moist (continued)	CL					190								<u>:</u>				
							-									:				
							-									<del>.</del>				
					$\bigvee$		50(4")	. 4								<u>:</u>				
-35-			Kta		$\triangle$		20	. 4		<u> </u>	:		:	:	:	:	:	<u>:</u>		
		SHALE, dark gray to gray, clayey, fossiliferous, with moderately spaced horizontal bed						185												
ļ -		fractures, moderately weak, dry to damp	$\bar{z}$			(1)	-									:				
ļ .			Kta			71 (	-	. 4												
ļ -		LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry				Ì										<u>:</u>				
-40-		$q_u = 212 \text{ tsf}; \ \gamma = 125 \text{ pcf at } 38.0'$ moderately spaced horizontal bed fractures						. 4		<u>:</u>	:		:	:	<u>:</u>	:	<u>:</u>	<u>:</u>		
		moderately spaced horizontal bed fractures 38.0' to 40.0'						180												
ļ .	Ħ	closely spaced horizontal bed fractures 40.0' to 43.2'				(00		. ]												
ļ	Ħ	to 43.2 <sup>t</sup>				00 (100)														
ļ .	H	$q_u = 43 \text{ tsf}$ ; $\gamma = 124 \text{ pcf}$ at 42.0' very closely spaced horizontal bed fractures																		
-45-		40.01 . 44.01								- :	:	:		:	<u>:</u>	:	<u>:</u>			
_ '-	Ħ	closely spaced horizontal bed fractures 44.0' to 55.0'						175 <del>.</del>												
L -	Ħ					(88)														
	Ħ					(3)														
	Ħ					-														
-50-	H									- :	:	:		:	<u>:</u>	:	<u>:</u>			
	H	moderately weathered at 51.2'						170·												
ļ	H					(2)														
L -	H					87 (82)														
L -	Ħ					$ \infty $														
-55-	Ħ	moderately spaced horizontal bed fractures,									:			:	:	:	<u>:</u>	<u>:</u>		
	H	with evaporite lenses 55.0' to 60.0'						165												
L .	H					(86)														
L .	H					6) 86											<u>.</u> .			
L .	Ħ					6				<u>:</u>									,	
-60-	Ħ	moderately weathered 60.0' to 62.0'									:	:		:	:	:	:	<u>:</u>		
	Ħ	-						160											,	
L.	Ħ	closely spaced horizontal bed fractures 62.0'				(0)				<u> </u>										
L	Ħ	to 64.0' vertical fracture at 64.0'				(08) 00													]	
Ĺ	H	very closely spaced horizontal bed fractures	Kau			10														
		64.3' to 65.0' Unified log.gdt library, dual log.glb one					D.D.			<u> </u>							CC CDI			



# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-27A PAGE 3 OF 3

Job Location: Austin, Texas Engineer's Job #: 14106090.002

GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	ELEVATION, ft.	HAND PEN. tsf		)	1 -2u	ım • N	Ioistu	#200 are Cor	ntent,	-#4 % LL	5	Plasticity
	LIMESTONE, gray to light gray, fossiliferous, moderately weak, dry (continued) moderately spaced horizontal bed fractures below 65.0' slightly weathered 70.0' to 72.0'	Kau	M	/8	87 (78)   94 (94)   S	- -45. - - -45.	_ 5· _ _ _	- -		20		40		60	80	100	
	Bottom of hole at 75.0 feet.																





Job Name: Springdale Road/US 290 Water Improvements

**Boring B-28A** PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

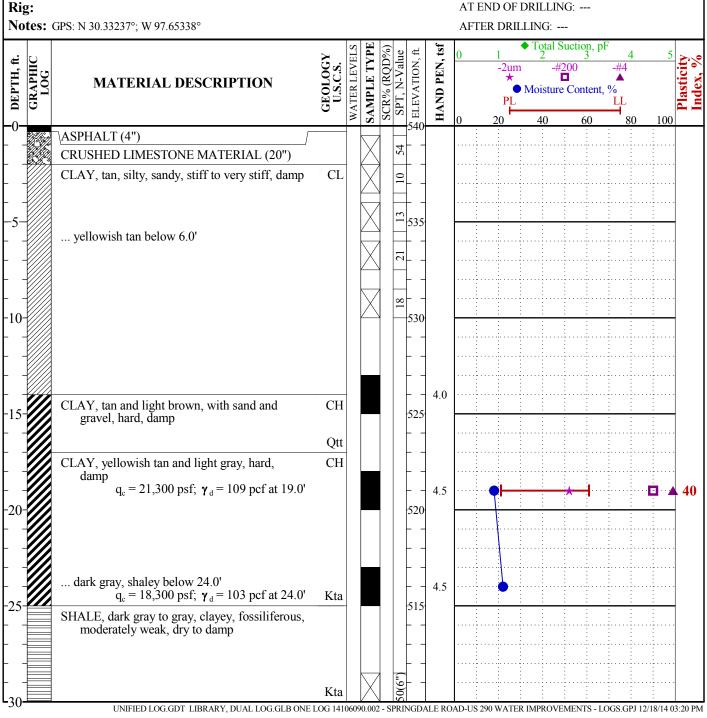
Client: City of Austin

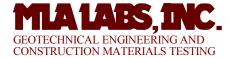
Hole Size: 4.5 in.

**Drill Date:** October 14, 2014 **Ground Elevation:** 540 ft **Ground Water Levels:** 

AT TIME OF DRILLING: ---

AT END OF DRILLING: ---





-LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-28A PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

OEPTH, ft.	GRAPHIC LOG		¥	Ń	Ξì															
-30		MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVEL	SAMPLE TYPI	SCR% (RQD%)	SPT, N-Value	ELEVATION, ft.	HAND PEN, tsf	0		2um ★ PL	) Mo	isture	200 Con	tent,	-#4 % LL	ļ <u>.</u>		Plasticity Index, %
		SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp (continued) highly weathered 30.0' to 30.5' moderate to closely spaced horizontal bed fractures 30.5' to 40.0' $q_u = 143 \text{ tsf}; \; \gamma = 139 \text{ pcf at } 32.0'$			S	S (88) <i>L</i> 6		510   	I		20		4	10	6	0	8		100	
-35 - - - - -40		$q_u = 176 \; tsf; \; \pmb{\gamma} = 130 \; pcf \; at \; 38.0'$ moderately spaced horizontal bed fractures below $40.0'$				100 (100)	-	505·    500·												
45-		highly weathered 45.0' to 45.5' completely weathered 45.5' to 46.0'				(06) 26	-	   495												
-50		Bottom of hole at 50.0 feet.	Kta			100 (90)	-	   490												



Job Name: Springdale Road/US 290 Water Improvements

Boring B-29A PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

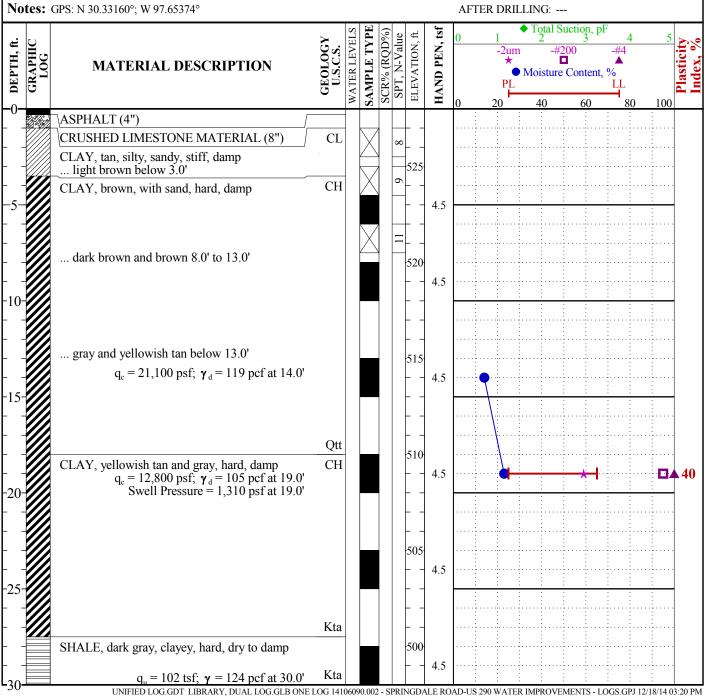
Hole Size: 4.5 in.

**Drill Date:** October 6, 2014 **Ground Elevation:** 528 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

Rig: AT END OF DRILLING: ---





# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-29A PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Cli	ient:	City of Austin																				
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	ELEVATION, ft.	HAND PEN, tsf	0			1 -2u ★	m • M		-#2( <b>-</b>	00	n, pF	-#4 <b>^</b>	4	5	Plasticity Index, %
30				W/	SA	SC	S	E	H/H	0		2	20		40		6	0	. {	80	100	
  		SHALE, dark gray, clayey, hard, dry to damp <i>(continued)</i> closely spaced oblique fractures 30.0' to 35.0' highly weathered 34.0' to 37.0'				88 (75)		  495 <sup>.</sup> 														
-35-  		$q_u = 121 \; tsf; \; \pmb{\gamma} = 130 \; pcf \; at \; 37.0'$ closely spaced horizontal bed fractures 37.0' to 40.0'				95 (68)		  490 														
-40-  		oblique fracture at 40.0' highly weathered 40.0' to 44.5'				(09) 56		  485														
<u>-</u>		completely weathered 44.5' to 45.0'	Kta								:		i	:		:			<u>:</u>			
-45-		LIMESTONE, gray to light gray, fossiliferous, with closely spaced horizontal bed fractures, moderately weak, dry slighty weathered, pitted 45.0' to 45.7'	Kau			(82) 26		  480 														
30		Bottom of hole at 50.0 feet.																				





Job Name: Springdale Road/US 290 Water Improvements

Boring B-29B PAGE 1 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Client: City of Austin

Hole Size: 4.5 in.

**Drill Date:** October 10, 2014 **Ground Elevation:** 529 ft

**Ground Water Levels:** 

AT TIME OF DRILLING: ---

**Rig:**AT END OF DRILLING: ---**Notes:** GPS: N 30.33150°; W 97.65380°
AFTER DRILLING: ---

**Notes:** GPS: N 30.33150°; W 97.65380° ▼ Total Suction, pI WATER LEVELS SAMPLE TYPE SCR% (RQD%) SPT, N-Value GRAPHIC LOG PEN, ELEVATION, DEPTH, MATERIAL DESCRIPTION HAND] Moisture Content, 20 40 60 100 ASPHALT (4") CRUSHED LIMESTONE MATERIAL (20") CLAY, brown and tan, with sand and gravel, CH 4.5 hard, damp dark brown 4.0' to 8.5' 4.5 4.0 .. gray and reddish tan below 8.5' <u>چ</u>|520 CLAY, light gray and yellowish tan, with sand CL 3.0 and gravel, very stiff, damp  $q_c = 6,200 \text{ psf}; \ \gamma_d = 110 \text{ pcf at } 14.0'$ Qtt CLAY, yellowish tan and gray, hard, damp CH  $q_c = 7,800 \text{ psf}; \ \gamma_d = 97 \text{ pcf at } 19.0'$  dark gray, shaley below 19.5' 510 4.5 Kta SHALE, dark gray to gray, clayey, fossiliferous, ල|505 moderately weak, dry to damp -25  $I_d(2) = 57\%$  at 25.0' moderately spaced horizontal bed fractures 25.0' to 40.0' 500 ... completely weathered 29.5' to 30.0' Kta

# -LOG OF BORING-

Job Name: Springdale Road/US 290 Water Improvements

Boring B-29B PAGE 2 OF 2

Job Location: Austin, Texas Engineer's Job #: 14106090.002

Cli	ent:	City of Austin															
DEPTH, ft.	GRAPHIC LOG	MATERIAL DESCRIPTION	GEOLOGY U.S.C.S.	WATER LEVELS	SAMPLE TYPE	SCR% (RQD%)	SPT, N-Value	ELEVATION, ft.	HAND PEN, tsf	0	-2um ★ PL	Moistu	Suction, 3	-# nt, % L	L L		Plasticity Index, %
-30-		SHALE, dark gray to gray, clayey, fossiliferous, moderately weak, dry to damp (continued)			S					0 2	20	40	60		80	100	
 		$q_u = 107 \text{ tsf}; \ \gamma = 123 \text{ pcf at } 34.0'$				(96) 86	1 1	 495									
-35-  						(06)											
 40-		$q_u = 154 \text{ tsf}; \; \pmb{\gamma} = 124 \text{ pcf at } 39.0'$ completely weathered 40.0' to 41.3'				(06) 56		 490 									
		closely spaced horizontal bed fractures 41.3' to 45.0'				3 (75)											
-45-		moderately spaced horizontal bed fractures below 45.0'				93		 485 						:			
 						92 (92)											
-50-		Bottom of hole at 50.0 feet.	Kta					480 						<u>i</u>	:		
		UNIFIED LOG GDT LIBRARY DUAL LOG GLB ONE															

# **SOIL CLASSIFICATION CHART**

100.400		IONIO	SYM	BOLS	TYPICAL			
M.	AJOR DIVISI	IONS	GRAPH	LETTER	<b>.</b>			
	GRAVEL AND	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
004005	GRAVELLY SOILS	(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES			
COARSE GRAINED SOILS	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES			
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES			
MORE THAN 50% OF MATERIAL IS	SAND AND	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES			
LARGER THAN NO. 200 SIEVE SIZE	SANDY SOILS	(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES			
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES			
		(APPRECIABLE AMOUNT OF FINES)		sc	CLAYEY SANDS, SAND - CLAY MIXTURES			
FINE GRAINED				ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY			
SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS			
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY			
SIZE	CLAYS LIQUID LIMIT GREATER THAN 50			СН	INORGANIC CLAYS OF HIGH PLASTICITY			
SOILS	OF MODERATE PL	ASTICITY		CL-CH	LOW PI CLAYS WITH APPRECIABLE HIGH PI MOTTLING, CLAY WITH BORDERLINE CLASSIFICATION			
	OTHER MATERIAI	S		FILL	MATERIAL NOT NATURALLY DEPOSITED			
·				LS	WEATHERED LIMESTONE			
THE CHITTING THE C	MANUAL TANKS	CATE PORDEDLINE COLL			INTACT LIMESTONE			

# **Key to Terms and Abbreviations**

Descriptive Terms Characterizing Soils and Rock	Standard Description	Symbols and
	Abbreviations and	Abbreviations for
	Terms	Test Data
Slickensided – having inclined planes of weakness that are	brn = brown	LL = Liquid Limit
slick and glossy in appearance.	dk = dark	PL = Plastic Limit
Fissured – containing shrinkage cracks frequently filled	lt = light	PI = Plasticity Index
with fine sand or silt, usually more or less vertical.	wx = weathered	(LL-PL)
<b>Laminated</b> – composed of thin layers of varying color or	calc = calcareous	$\gamma_d = 95$ -Dry Unit
texture. Layers are typically distinct and varying in	sw = severely weathered	Weight
composition from sand to silt and clay.	cw = completely	$\gamma = $ Unit Weight
Varved – see Laminated.	weathered	SPT = standard
<b>Crumbly</b> – cohesive soils which break into small blocks or	n/a = not available	penetration test
crumbs on drying.	b. = below	N = blows per foot
<b>Argillaceous</b> – having appreciable amounts of clay in the		from SPT
soil or rock mass. Used most often in describing		SCR = standard core
limestones, occasionally sandstones.	Engineering Units	recovery
Calcareous – containing appreciable quantities of calcium	pcf = pounds per cubic	RQD = rock quality
carbonate. Can be either nodular or "powder."	foot	designation
<b>Mottled</b> – characterized as having multiple colors organized	psf = pounds per square	RQI = see RQD
in a marbled pattern.	foot	$q_u = unconfined$
<b>Evaporite</b> – deposits of salts and other soluble compounds.	tsf = tons per square foot	compressive
Most commonly calcium carbonate or gypsum. May be	pF = picofarad	strength
in either "powder" or visible crystal form.	psi = pounds per square	$q_c = confined$
<b>Ferruginous</b> – having deposits of iron or nodules, typically	foot	compressive
oxidized and dark red in color.	ksf = thousand pounds	strength
	per square foot	$I_d(2) = \text{slake durability}$
	kips = thousand pounds	index (second
	(force)	cycle)

Terms Describing Consistency of Soil and Rock

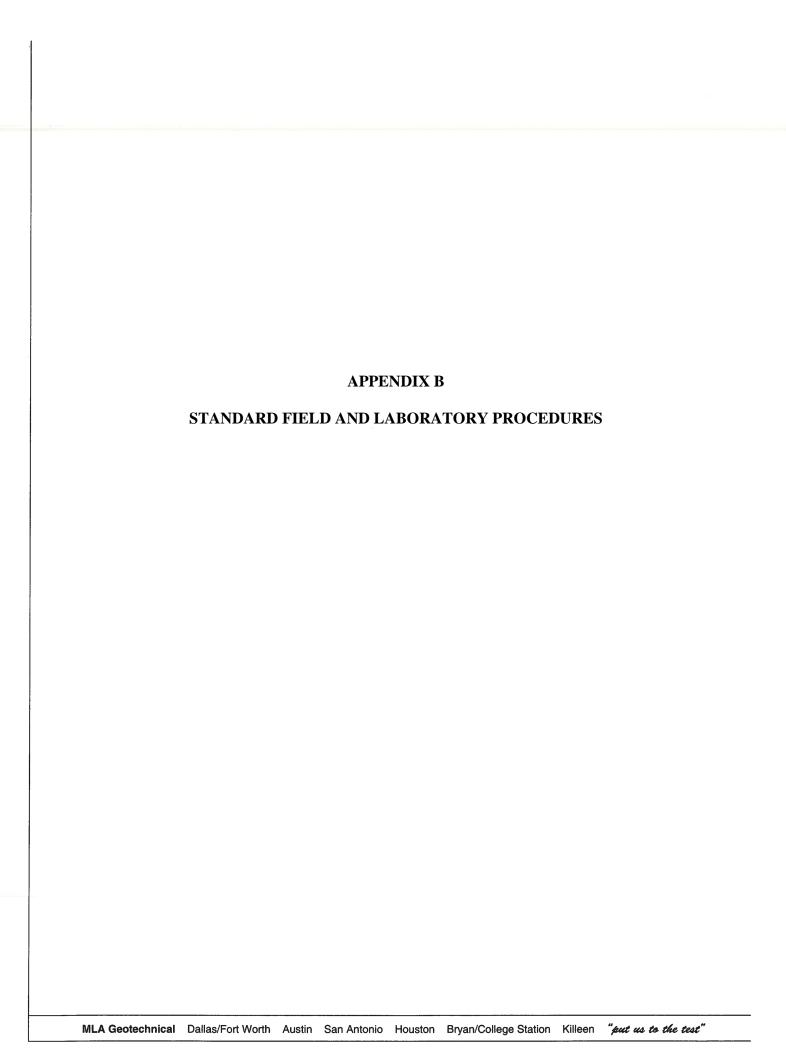
COARSE GRAI	NED MATERIAL	SEDIMENTARY ROCK				
DESCRIPTIVE	BLOWS/FT (SPT)	DESCRIPTIVE	STRENGTH, TSF			
TERM		TERM				
very loose	0 - 4	soft	4 - 8			
loose	4 – 10	medium	8 - 15			
firm (medium)	10 - 30	hard	15 - 50			
dense	30 - 50	very hard	over 50			
very dense	over 50					

**Describing Consistency of Fine Grained Soil** 

DESCRIPTIVE	BLOWS/FT (SPT)	UNCONFINED COMPRESSION, TSF				
TERM						
very soft	< 2	< 0.25				
soft	2 - 4	0.25 - 0.50				
medium stiff	4 - 8	0.50 - 1.00				
stiff	8 – 15	1.00 - 2.00				
very stiff	15 - 30	2.00 - 4.00				
hard	over 30	over 4.00				

Sample Type Key Auger Cuttings Shelby Tube Split Spoon **Rock Core** No Sample

Revised: Dec 5, 2014



#### STANDARD FIELD AND LABORATORY PROCEDURES

#### STANDARD FIELD PROCEDURES

#### **Drilling** and Sampling

Borings and test pits are typically staked in the field by the drillers, using simple taping or pacing procedures and locations are assumed to be accurate to within several feet. Unless noted otherwise, ground surface elevations (GSE) when shown on logs are estimated from topographic maps and are assumed to be accurate to within a foot. A Plan of Borings or Plan of Test Pits showing the boring locations and the proposed structures is provided in the Appendix.

A log of each boring or pit is prepared as drilling and sampling progressed. In the laboratory, the driller's classification and description is reviewed by a Geotechnical Engineer. Individual logs of each boring or pit are provided in the Appendix. Descriptive terms and symbols used on the logs are in accordance with the Unified Soil Classification System (ASTM D-2487). A reference key is also provided. The stratification of the subsurface material represents the soil conditions at the actual boring locations, and variations may occur between borings. Lines of demarcation represent the approximate boundary between the different material types, but the transition may be gradual.

A truck-mounted rotary drill rig utilizing rotary wash drilling or continuous flight hollow or solid stem auger procedures is used to advance the borings, unless otherwise noted. A backhoe provided by others is used to place test pits. Test pits are advanced to the required depth, refusal (typically bedrock) or to the limits of the equipment. Samples of soil are obtained from the borings or test pit spoils for subsequent laboratory study. Samples are sealed in plastic bags and marked as to depth and boring/pit locations in the field. Cores are wrapped in a polyethylene wrap to preserve field moisture conditions, placed in core boxes and marked as to depth and core runs. Unless notified to the contrary, samples and cores will be stored for 90 days, then discarded.

#### Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM D-1586) (SPT)

This sampling method consists of driving a 2 inch outside diameter split barrel sampler using a 140 pound hammer freely falling through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven an additional 12 inches. The number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance. The results of the SPT is recorded on the boring logs as "N" values.

## Thin-Walled Tube Sampling of Soils (ASTM D-1587) (Shelby Tube Sampling)

This method consists of pushing thin walled steel tubes, usually 3 inches in diameter, into the soils to be sampled using hydraulic pressure or other means. Cohesive soils are usually sampled in this manner and relatively undisturbed samples are recovered.

#### Soil Investigation and Sampling by Auger Borings (ASTM D-1452)

This method consists of auguring a hole and removing representative soil samples from the auger flight or bit at intervals or with each change in the substrata. Disturbed samples are obtained and this method is, therefore, limited to situations where it is satisfactory to determine the approximate subsurface profile and obtain samples suitable for Index Property testing.

#### Diamond Core Drilling for Site Investigation (ASTM D-2113)

This method consists of advancing a hole into hard strata by rotating a single or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water or air is used to remove the cuttings and to cool the bit. Normally, a 3 inch outside diameter by 2-1/8 inch inside diameter coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and in the laboratory and the cores are stored in partitioned boxes. The intactness of all rock core specimens is evaluated in two ways. The first method is the Standard Core Recovery expressed as the length of the total core recovered divided by the length of the core run, expressed as a percentage:

SCR = total core length recovered x 100% length of core run

This value is exhibited on the boring logs as the Standard Core Recovery (SCR).

The second procedure for evaluating the intactness of the rock cores is by Rock Quality Designation (RQD). The RQD provides an additional qualitative measure of soundness of the rock. This index is determined by measuring the intact recovered core unit which exceed four inches in length divided by the total length of the core run:

RQD = all core lengths greater than 4" x 100% length of core run

The RQD is also expressed as a percentage and is shown on the boring logs.

#### Vane Shear Tests

In-situ vane shear tests may be used to determine the shear strength of soft to medium cohesive soil. This test consists of placing a four-bladed vane in the undisturbed soil and determining the torsional force applied at the ground surface required to cause the cylindrical perimeter surface of the vane to be sheared. The torsional force sufficient to cause shearing is converted to a unit of shearing resistance or cohesion of the soil surrounding the cylindrical surface.

#### THD Cone Penetrometer Test

The THD Cone Penetrometer Test is a standard field test to determine the relative density or consistency and load carrying capacity of foundation soils. This test is performed in much the same manner as the Standard Penetration Test described above. In this test, a 3 inch diameter penetrometer cone is used in place of a split-spoon sampler. This test calls for a 170-pound weight falling 24 inches. The actual test in hard materials consists of driving the penetrometer cone and accurately recording the inches of penetration for the first and second 50 blows for a total of 100 blows. These results are then correlated using a table of load capacity vs. number of inches penetrated per 100 blows.

#### **Ground Water Observation**

Ground moisture observations are made during the operations and are reported on the logs of boring or pit. Moisture condition of cuttings are noted, however, the use of water for circulation precludes direct observation of wet conditions. Water levels after completing the borings or pits are noted. Seasonal variations, temperatures and recent rainfall conditions may influence the levels of the ground water table and water may be present in excavations, even though not indicated on the logs.

#### STANDARD LABORATORY PROCEDURES

To adequately characterize the subsurface material at this site, some or all of the following laboratory tests are performed. The results of the actual tests performed are shown graphically on the Logs of Boring or Pit.

#### Moisture Content - ASTM D-2216

Natural moisture contents of the samples (based on dry weight of soil) are determined for selected samples at depths shown on the respective boring logs. These moisture contents are useful in delineating the depth of the zone of moisture change and as a gauge of correlation between the various index properties and the engineering properties of the soil. For example, the relationship between the plasticity index and moisture content is a source of information for the correlation of shear strength data.

#### Dry Density - ASTM D-7263

The dry density,  $\gamma_d$ , (bulk density or unit weight) of the samples is determined for selected samples at depths shown on the respective boring logs using Method B of the aforementioned ASTM standard. The in-situ density was determined from undisturbed SPT samples and the dry density was calculated using moisture content results. These dry density values are useful for calculating other characteristic values such as porosity, void ratio, and mass composition of soil. Additionally, these values can also be used to assess the degree of compaction or consolidation of fill materials.

#### Atterberg Limits - ASTM D-4318

The Atterberg Limits are the moisture contents at the time the soil meets certain arbitrarily defined tests. At the moisture content defined as the plastic limit, Pw, the soil is assumed to change from a semi-solid state to a plastic state. By the addition of more moisture, the soil may be brought up to the moisture content defined as the liquid limit, Lw, or that point where the soil changes from a plastic state to a liquid state. A soil existing at a moisture content between these two previously described states is said to be in a plastic state. The difference between the liquid limit, Lw, and the plastic limit, Pw, is termed the plasticity index, Iw. As the plasticity index increases, the ability of a soil to attract water and remain in a plastic state increases. The Atterberg Limits that were determined are plotted on the appropriate log.

The Atterberg Limits are quite useful in soil exploration as an indexing parameter. Using the Atterberg Limits and grain size analysis, A. Casagrande developed the Unified Soils Classification System (USCS) which is widely used in the geotechnical engineering field. This system related the liquid limit to the plasticity index by dividing a classification chart into various zones according to degrees of plasticity of clays and silts. Although the Atterberg Limits are an indexing parameter, K. Terzaghi has related these limits to various engineering properties of a soil. Some of these relationships are as follows:

- 1. As the grain size of the soil decreases, the Atterberg Limits increase.
- 2. As the percent clay in the soil increases, the Atterberg Limits increase.
- 3. As the shear strength increases, the Atterberg Limits decrease.
- 4. As the compressibility of a soil increases, the Atterberg Limits increase.

### Swell Pressure Test - ASTM D-4546-96

The swell pressure test assesses the potential for swell of soil. This value is useful for the design of various structures such as slab-on-ground foundations, piers and piles, and underground utilities. Method C of the aforementioned ASTM standard determines the pressure required to keep a soil sample at equilibrium under swelling conditions. This is done by placing the sample in a consolidometer under a seating load and giving the sample free access to water. A constant height of the sample is maintained and the vertical pressure on the sample is adjusted until equilibrium is reached. The vertical pressure on the sample at equilibrium is reported as the swell pressure. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.

### Triaxial Shear Test - ASTM D-2850-70

Triaxial tests may be performed on samples that are approximately 2.83 inches in diameter, unless a smaller diameter sample was necessary to achieve a more favorable length:diameter (L:D) ratio. A minimum length to diameter ratio (L:D) of 2.0 is maintained to reduce end effects.

The triaxial tests are typically unconsolidated-undrained using nitrogen gas for chamber confining pressure. Confining pressures are selected to conform to in-situ hydrostatic pressure considering the earth to be a fluid of 120 pcf. In this test, undisturbed Shelby tube samples are trimmed so that their ends are square and then pressed in a triaxial compression machine. The load at which failure occurs is the compressive strength. The results of the triaxial tests and the correlated hand penetrometer strengths can be utilized to develop soil shear strength values. These test provide the confined compressive strength,  $q_c$ , which are presented on the Logs of Boring at the depth of the samples tested.

### Unconfined Compressive Strength of Rock Cores - ASTM D-2938

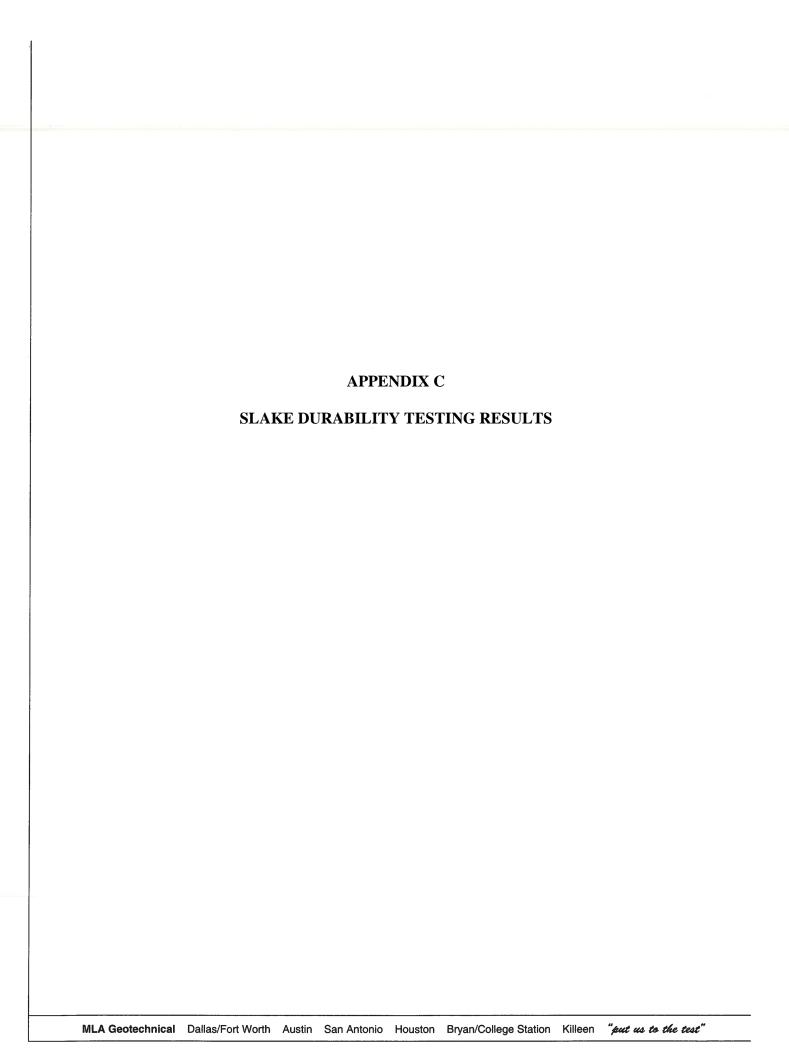
The unconfined compressive strength,  $q_u$ , is a valuable parameter useful in the design of foundation footings. This value, qu, is related to the shearing resistance of the rock and thus to the capacity of the rock to support a load. In completing this test it is imperative that the length:diameter ratio of the core specimens are maintained at a minimum of 2:1. This ratio is set so that the shear plane will not extend through either of the end caps. If the ratio is less than 2.0 a correction is applied to the result.

### Grain Size Analysis - ASTM D-421 and D-422

Grain size analysis tests are performed to determine the particle size and distribution of the samples tested. The grain size distribution of the soils coarser than the Standard Number 200 sieve is determined by passing the sample through a standard set of nested sieves, and the distribution of sizes smaller than the No. 200 sieve is determined by a sedimentation process, using a hydrometer. The results are given on the log of Boring/Pit or on Grain Size Distribution semi-log graphs within the report.

### Slake Durability Test - ASTM D-4644

The slake durability test provides an index for the durability of a shale, or similar rock, considering the effects of wetting, drying, and abrasion. This index is used to quantify the strength of weak rock formations when exposed to natural wetting and drying cycles, especially in the context of underground tunneling and excavation. The index,  $I_d(2)$ , represents the percentage, by mass, of rock material retained after two wetting and drying cycles. These cycles are simulated by oven drying the sample followed by ten minutes of tumbling and soaking in water within a drum and trough apparatus. After tumbling and soaking, the sample is oven-dried and the mass of the sample is recorded. The results of these tests are presented on the Logs of Boring at the depth of the samples tested.



Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-22A (30-35 ft)

Gravimetric Water Content (%)	6.5
-------------------------------	-----

### Bath Temperature (°c)

Minimum	20.0
Maximum	21.2
Average	20.6

Slake Durability (%)	52.7
----------------------	------

	Туре	Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)
		Retained pieces remain virtually unchanged.
$\times$	[]	Retained materials consist of large and small pieces.
	III	Retained material is exclusively small fragments.

### As-Prepared



Jeffrey A. Kuhn, Ph.D., P.E., 11/25/2014

Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-22A (40-45 ft)

Gravimetric Water Content (%)	3.9
-------------------------------	-----

### Bath Temperature (°c)

Minimum	20.0
Maximum	20.6
Average	20.3

Slake Durability (%)	76.6
<b>3</b> \	

	Туре	Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)
		Retained pieces remain virtually unchanged.
$\times$	II	Retained materials consist of large and small pieces.
	III	Retained material is exclusively small fragments.

### As-Prepared



Jeffrey A. Kuhn, Ph.D., P.E., 11/19/2014

Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-24A (30-35 ft)

Gravimetric Water Content (%)	4.2
Gravimotrio Water Content (70)	7.2

### Bath Temperature (°c)

Minimum	18.5
Maximum	20.6
Average	19.5

Slake Durability (%)	67.9
1	

	Туре	Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)
		Retained pieces remain virtually unchanged.
$\times$	II	Retained materials consist of large and small pieces.
	III	Retained material is exclusively small fragments.

### As-Prepared

# 1 8 2 3 3 7 4 5 -- 6 7 8 9

### Post-Test



Jeffrey A. Kuhn, Ph.D., P.E., 11/19/2014

Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-25B (25-30 ft)

Gravimetric Water Content (%)	3.5
-------------------------------	-----

### Bath Temperature (°c)

Minimum	18.7
Maximum	19.8
Average	19.2

Slake Durability (%)	81.5
• • •	

	Type Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)	
		Retained pieces remain virtually unchanged.
$\times$	II	Retained materials consist of large and small pieces.
	III	Retained material is exclusively small fragments.

### As-Prepared

### Post-Test



Jeffrey A. Kuhn, Ph.D., P.E., 11/19/2014

Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-26A (35-40 ft)

Gravimetric Water Content (%)	6.1
-------------------------------	-----

### Bath Temperature (°c)

Minimum	17.3
Maximum	19.5
Average	18.3

Slake Durability (%) 89.0
---------------------------

	Type Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)	
		Retained pieces remain virtually unchanged.
$\times$	II	Retained materials consist of large and small pieces.
	Ш	Retained material is exclusively small fragments.

### As-Prepared



### Post-Test



Jeffrey A. Kuhn, Ph.D., P.E., 11/19/2014

Client: MLA Labs, Inc. TRI Log #: E2391-20-09
Project: Springdale and 290 Test Method: ASTM D4644

Sample ID: B-29B (25-30 ft)

### Bath Temperature (°c)

Minimum	17.0
Maximum	19.3
Average	18.2

Slake Durability (%)	57.3

	Type Description of Fragments Retained in the Drum (ASTM D4644, Section 7.5)	
		Retained pieces remain virtually unchanged.
$\times$	II	Retained materials consist of large and small pieces.
	III	Retained material is exclusively small fragments.

### As-Prepared



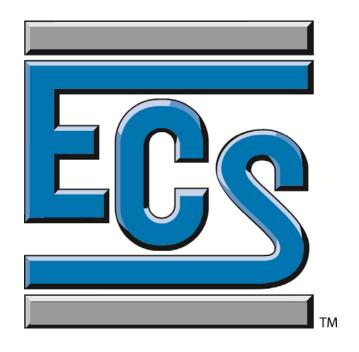
### Post-Test



Jeffrey A. Kuhn, Ph.D., P.E., 11/19/2014



## Appendix B. ECS Geotechnical Data Report, Dec 2012



# GEOTECHNICAL DATA REPORT - SPRINGDALE/HWY 290 WATER SYSTEMS IMPROVEMENTS

**AUSTIN, TEXAS** 

**ECS PROJECT NO: 17-3795** 

**FOR** 

**CITY OF AUSTIN, FDU: 3960 2207 7249** 

**DECEMBER 7, 2012** 



Geotechnical • Construction Materials • Environmental • Facilities

TX Registered Engineering Firm F-8461

December 7, 2012

Kevin Sweat, P.E. Public Works Department, Engineering Services Division 505 Barton Springs Road, 9<sup>th</sup> Floor, Suite 900 Austin, Texas 78704

ECS Project No. 17-3795

Subject: Geotechnical Data Report

Springdale/Hwy 290 Water Systems Improvements

FDU: 3960 2207 7249

Austin, Texas

Dear Mr. Sweat:

We have completed our subsurface exploration and are presenting the Geotechnical Data Report for the above-referenced project. Our geotechnical design recommendations and construction considerations for the project are presented in the Geotechnical Design Memorandum.

We appreciate the opportunity to serve as your geotechnical consultant for this project. Should you have any questions, comments, or concerns regarding this report, please contact the undersigned.

Respectfully,

ECS-TEXAS, LLP

Emmett F. Irby, Jr., P.E

Principal Engineer

Emmett Fulton (rby, Jr. 49160

Robert W. Archer, P.E.

Principal Engineer

Electronic seal approved by Emmett F. Irby, Jr., P.E. on December 7, 2012

Distribution: e-mail/Addressee

2 Hard Copies/Addressee

### GEOTECHNICAL DATA REPORT

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Test Boring Logs

Reference Notes for Boring Logs

**USCS** Information

Laboratory Test Summary

**Unconfined Compressive Test Results** 

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### **PROJECT OVERVIEW**

### Authorization

ECS-Texas, LLP (ECS) conducted this subsurface exploration and geotechnical engineering evaluation in accordance with proposal No. 17-3744R3, dated September 17, 2012. This study was authorized by issuance of a notice-to-proceed from the City of Austin with a FDU of 3960 2207 7249 dated October 15, 2012.

### **Project Information**

The proposed waterline improvements will be located along Springdale Road and US Highway 290 in Austin, Texas. In addition, waterline improvements will be made in the Walnut Place and Springdale Heights Subdivision on Springdale Road.

The project will include the installation of 11,440 linear feet of waterline that will vary in diameter from 6 to 16 inches. In addition, two pressure reducing valves (PRV) will be installed along US Hwy 290. Five creek crossings of the waterline will be required in the improvement project where pipe will be jacked or bored under the creek bed. Piezometers were installed at each creek crossing to monitor groundwater conditions over time. Within the streets the depth of the waterline will be approximately 5 feet below grade.

If any of the planned installation or alignments of the proposed waterlines described in this Geotechnical Design Memorandum is revised during the course of project design and implementation, or is different than as described herein, we recommend that ECS be consulted to determine if revisions to our recommendations are required.

### **Summary of Exploration**

The purpose of this exploration was to explore the subsurface conditions at the site and to develop geotechnical engineering recommendations for the project. We accomplished the purpose by:

- 1. Applying for permits to drill within TxDOT and Travis County right-of-way.
- 2. Calling utility locators (Texas 811) to mark underground utility lines.
- 3. Drilling 31 test borings to explore subsurface conditions.
- 4. Performing laboratory testing on selected representative soil samples to classify and to evaluate pertinent physical and engineering properties.
- 5. Analyzing the field and laboratory data and performing engineering analyses.

### **EXPLORATION PROCEDURES**

### Field Exploration

Thirty one (31) test borings were attempted at the site between November 8<sup>th</sup> and November 17<sup>th</sup>, 2012. Twenty (20) of the test borings were drilled to depths of 15 feet below the ground surface. Boring B-3 was not drilled due to overhead and below grade utilities at the location for the boring. Ten (10) of the test borings were drilled to depths of 50 feet below ground surface, two on each of five creek crossings. Five of the creek borings were converted to piezometers. Piezometers will be monitored on a monthly basis by ECS for approximately 24 months or until otherwise instructed.

Prior to calling utility locators, the locations of the borings were staked in the field by a representative of ECS and are illustrated on Figure 1 – *Boring Location Diagram*. The general location of the site in Travis County is present on Figure 2 – *Site Vicinity Map*. Borings were surveyed in on the Texas Central State Plane NAD83 Grid coordinate system with vertical data on 88NGVD. Surveying was completed by Loomis Partners of Austin and is presented in the Appendix section of the Geotechnical Data Report. Coordinates and elevations of the boreholes are presented on the boring logs.

Drilling was performed using truck-mounted drilling equipment. Boreholes were backfilled in accordance with the City of Austin Water Utility "Requirements for Geotechnical Investigations for Pipeline Projects". Minimal settlement should occur with the use of this procedure for backfilling boreholes.

### Shelby Tube Sampling

Soil samples were obtained using a Shelby Tube sampler in general accordance with ASTM D 1587. In this sampling procedure, a thin walled, seamless steel tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed soil sample is obtained. Samples were removed from samplers in the field, visually classified, and appropriately sealed in sample containers to preserve their in-situ moisture contents.

Where possible, small scale penetration tests were performed on samples of cohesive soil with the use of a calibrated hand "pocket" penetrometer. In this test, the unconfined compressive strength of a soil sample is estimated to a maximum of 4.5 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a small diameter, calibrated, spring-loaded cylinder. The results of such small scale testing are more qualitative than quantitative and are not intended to represent accurate measurements of unconfined compressive strength at the respective depths sampled and tested.

### Penetration Tests and Sampling

Where applicable, Standard Penetration Tests (SPTs) were performed to obtain representative samples and penetration resistance measurements in general accordance with ASTM D 1586. Soil samples were obtained at various intervals with a 1.625-inch inside diameter, 2-inch outside diameter, Split Spoon sampler. The Split Spoon sampler was first seated 6 inches to penetrate any loose cuttings, and then was driven an additional 12 inches with blows of a 140-pound

hammer falling 30 inches. The number of hammer blows required to drive the sampler each 6-inch increment was recorded. The penetration resistance "N-value" is defined as the number of hammer blows required to drive the sampler the final 12 inches and is indicated on the test boring log.

When properly evaluated, the N-value can be used as a qualitative indication of the in-place relative density of cohesionless soils, and in a less reliable way, the consistency of cohesive soils. The N-value is qualitative or semi-quantitative because many factors can significantly affect the measurement and prevent a direct correlation between in-situ density. Sources of variation include operators, drill rigs, drilling procedures, soil and groundwater conditions, and hammer-rod assemblies. In very dense materials such as completely to severely weathered residual rock material, the SPT test is usually stopped after 50 blows from the hammer and the measurement is recorded as 50 blows per distance penetrated (i.e. 50 over 3 inches).

### **Rock Coring**

Rock coring with the aid of an air compressor was performed using an Nx core barrel with an inside diameter of 2.125 inches. The recovered rock core was measured to determine the "percent recovery" (REC) and the Rock Quality Designation index value (RQD). The RQD value is defined as the percentage of length cored that is recovered in segments that are 4 inches or longer and is a qualitative index of the quality or physical integrity of the rock. Rock coring is typically performed in general accordance with ASTM D 2113. Rock core samples were placed in cardboard core boxes for transport to the laboratory.

### **Laboratory Testing**

Samples were transported to ECS's laboratory where they were examined and visually classified by an ECS geotechnical engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. To aid in classification of the soils and determination of their selected engineering characteristics, a testing program was conducted on selected samples in general accordance with the following standards:

Laboratory Test	Test Standard
Moisture Content	ASTM D 2216
Atterberg Limits	ASTM D 4318
Amount of Material Finer than No. 200 Sieve	ASTM D 1140
Sieve Analysis	ASTM D 422
pH, Sulfate, Chloride & Resistivity	Approved Analytical Methods
Unconfined Compressive Strength (Rock)	ASTM D 2938
Unconfined Compressive Strength (Soil)	ASTM D 2166

Results of the laboratory tests are included in the Appendix on the boring logs and are presented on the Laboratory Test Summary table. Laboratory test results were used to verify visual classification of the soils encountered as outlined by USCS in general accordance with ASTM D 2487. The USCS group symbols for each soil type are indicated in parentheses following the soil descriptions on the test boring logs and on the Laboratory Test Summary table. A brief explanation of the USCS is included in the Appendix.

Springdale/Hwy 290 Water Systems Improvements – Austin, Texas ECS Project 17-3795

All samples were returned to ECS's laboratory in Austin, Texas. Samples not tested in the laboratory will be stored for a period of 60 days subsequent to submittal of this report and will be discarded after this period, unless instructions are received from the client regarding their disposition.

### **EXPLORATION RESULTS**

### **Local Geology**

Based on a review of the Geologic Atlas of Texas, Austin Sheet, reprinted 1992, the local geology for the pipeline alignments comprises Tributary terrace deposits (Qtt), Alluvium (Qal) and Taylor Group (Kta). The Alluvium and Tributary terrace deposits generally consist of gravel, sand, silt and clay. These formations vary in color from tan to light gray. The Taylor Group is clay that is dark gray to green-gray, calcareous and montmorillonitic in nature.

### **Summary of Subsurface Conditions**

The strata descriptions provided herein are of a generalized nature to highlight the major soil stratification features and soil characteristics. The test boring logs provided in the Appendix should be reviewed for specific information at each location. The stratification of the soil represents an interpretation of the subsurface conditions at the test boring locations based on observations by an ECS geotechnical engineer of the test boring samples. Variations from the conditions shown on the test boring logs could occur in areas between the test borings. The stratification lines shown in the test boring logs represent approximate boundaries between soil types and condition, and the transitions may be gradual rather than distinct. It is sometimes difficult to identify changes in stratification within narrow limits.

Some borings were drilled within the pavement section of the roadway. The table below presents the street location, boring number, asphalt thickness and base course thickness.

PAVEMENT SECTIONS											
Street	Boring	Asphalt Thickness (Inches)	Base Course Thickness (Inches)								
Springdale	B-6	3	10								
Springdale	B-7	3/4	1								
Springdale	B-11	4	7								
Carla	B-14	4	18								
Quiette	B-15	2	4								

Information from the test borings indicates that the natural soil stratigraphy in the area of pipeline replacement and new construction may generally consist of two (2) distinguishable strata with soil color variations within a depth of approximately 50 feet below the natural ground surface. A detailed discussion of the soil strata is included in the following table and paragraphs.

	SUMMARY OF SUBSURFACE CONDITIONS										
Stratum	Description	Depth to Top of Stratum (ft)	Depth to Bottom of Stratum (ft)								
А	CLAY, Sandy, Silty, Dark Brown to Brownish Orange to Yellowish Brown, Stiff to Hard, with calcareous deposits and some gravel (CL/CH)	0	15 to 27								
В	SHALE, Gray, with limestone and limestone layers	15 to 27	50 (boring termination)								

**Stratum A** comprises stiff to hard, dark brown to brownish orange to yellowish brown sandy, silty CLAY with calcareous nodules and sandy gravel layers. This stratum was encountered beneath the ground surface and extended to depths of 15 to 27 feet below grade in all borings. Liquid limit tests performed on soil samples in Stratum A were found to range from 27 to 83 with corresponding plasticity indices ranging from 14 to 60. Unconfined compressive strength tests on Shelby tube samples of the clay soil ranged from 2.6 to 11.5 tons per square foot. The percent passing the #200 sieve ranged from 8.7 to 98.7. In-situ moisture contents at the time of testing ranged from 2.5 to 27 percent in the samples tested. Measured pocket penetrometer readings ranged from 1.0 to in excess of 4.5 tons per square foot.

Stratum B comprises primarily gray SHALE with intermittent limestone layers and limestone. This stratum was encountered beneath Stratum A soil to depths of 50 feet, the maximum depth explored. Limestone layers and limestone were encountered in Borings B-23, B-25 and B-28 at depths of 30 feet, 40 feet and 45 feet, respectively. Alternating shale and clay layers were encountered in Boring B-24 from a depth of 30 feet below ground surface to boring termination. Liquid limit tests performed on shale samples in Stratum B were found to range from 56 to 74 with corresponding plasticity indices ranging from 38 to 52. The percent passing the #200 sieve ranged from 91.1 to 96.6. In-situ moisture contents at the time of testing ranged from 14 to 25 percent in samples tested. Measured pocket penetrometer readings were in excess of 4.5 tons per square foot (tsf). SPT "N" values ranged from 40 to in excess of 50 blows per foot. Percent recovery on core samples of the shale ranged from 93 to100, while RQD values ranged from 90 to 98 percent. Unconfined compressive strengths of limestone cores ranged for 66.4 to 82.5 tons per square foot.

The clay soils of Stratum A are within the zone of seasonal moisture change (a.k.a. active zone, approximately 15 feet) and will experience changes in moisture content due to changes in climate and site conditions (rainfall quantities and frequency, humidity, temperature, vegetation, and site covering). The clay soils within this stratum may harden, shrink, and crack during extended dry periods, and soften and swell during extended moist periods.

### **Groundwater Observation**

Groundwater was encountered in borings B-22, B-24, B-27 and B-31 at depths of 13.5, 28, 18 and 18.5 feet below ground surface, respectively, during the field exploration. Groundwater depth and elevation are summarized in the following table.

GROUNDWATER CONDITIONS											
Boring Locations Depth (ft) Elevation											
B-22	13.5	490.5									
B-24	28	501.0									
B-27	18	503.0									
B-31	18.5	525.5									

We should note that groundwater levels at the site could fluctuate as a result of seasonal and climatic variations. As stated previously, piezometers were installed at each creek crossing of the new water pipeline systems. Piezometers will be monitored by ECS over a period up to 24 months starting in January of 2013 for groundwater conditions. A monthly report will be issued with groundwater conditions at each location. Once completed, the piezometers will have to be properly closed in accordance with Texas Commission on Environmental Quality (TCEQ) regulations, unless ECS is otherwise instructed.

### Corrosion

Selected soil samples were delivered to Austin Analytical for testing for pH, sulfates, chlorides, and resistivity/conductivity. Austin Analytical is an approved laboratory for chemistry testing by the TCEQ. Results from Austin Analytical are presented in the Appendix section of this report. To summarize, the information is presented in the following table:

SUMMARY OF ANALYTICAL TESTING OF SOILS												
Boring and Sample Depth (ft)	рН	Sulfates (ppm)	Chlorides (ppm)	Resistivity/Conductivity (ohm/cm - μS/cm)								
B-27, 4 to 6	8.1	910	31	833/1,200								
B-29, 23 to 25	8.5	17,000	49	59/17,000								
B-31, 81/2 to 10	8.4	770	180	1,163/860								

Based on the results of analytical testing, soil conditions encountered at the site are prone to cause corrosion of iron and steel piping. Resistivity values for soil tested ranged from 59 to 1,163 ohm/cm having the characteristics of very poor resistance to corrosion. Alternative pipe material may have to be considered in-lieu-of iron and steel piping. Additionally, sulfate content of soil tested at a depth of 23 to 25 feet in Boring B-29 indicates a severe condition for attack on concrete with other than Type V cement in the concrete mix. Construction may not take place at this depth; however, should there be, caution should be given to the type of cement used in concrete.

### **Summarization and Conclusions**

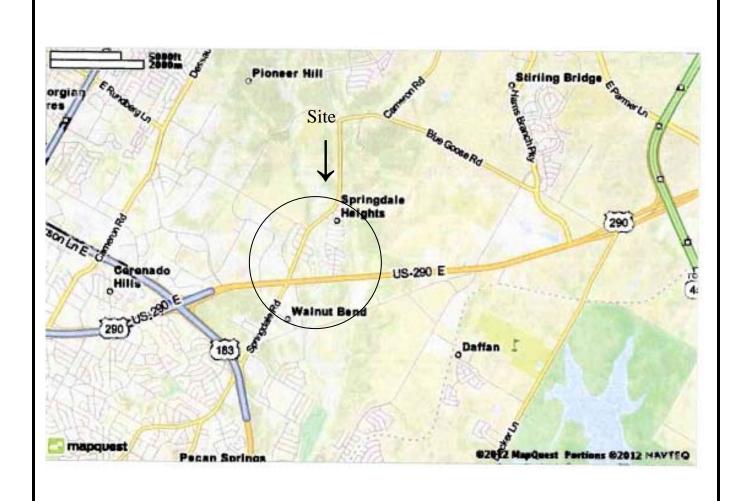
This completes the Geotechnical Data Report for the project. In general, soil conditions at the site are conducive to the construction of the waterline and should not present concerns for conventional construction equipment. Corrosion of iron and steel piping may be of concern due to the low resistivity values of the soil. Alternative piping material, such as High Density Polyurethane (HDPE) or Polyvinyl Chloride (PVC) piping should be considered. Runoff from precipitation during construction should be directed away from the pipeline trench by placing berms at strategic locations. These matters will be addressed in Geotechnical Design Memorandum.

Trench depth for the waterline will be greater than 3 feet; therefore, trench safety should be considered in accordance with OSHA guidelines. Wet or saturated side walls of the trench are subject to sloughing. Even though soils at the site are cohesive in nature, soil excavation material should be placed such that the toe of slope of the excavated material is a minimum of 5 feet from the edge of the trench.

### **FIGURES**

Figure 1: Boring Location Diagram

Figure 2: Site Vicinity Map



Vicinity Map

Springdale Rd. & US Hwy 290 Water System Improvements



ECS-TEXAS, LLP 2120 Denton Drive, Suite 105, Austin, TX 78758

Prepared By:	SCALE:	PROJECT No.:
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Background Image:	DATE:	FIGURE No.:
Google Maps	11/14/2012	1

### **APPENDIX**

Test Boring Logs
Reference Notes for Boring Logs
USCS Information
Laboratory Test Summary
Unconfined Compressive Test Results
Sieve Analyses Test Results
Austin Analytical Testing Results
Loomis Partners Surveying Data

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_					, .		,	5	40   `	<b>,</b>			:
_	S-2	ST	24	24									:
_													
5 —	S-3	ST	24	24									:
_									_   6	3			:
_	S-4	SS	18	18				5	35   7		12.2-	<del></del>	
_													
_	S-5	ss	18	18						3	1414.1		:
10									3	3			
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_									"				:
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_	S-6	ss	18	18					6	3	12-⊗		:
15 —					END OF BOR	ING @ 15.00'	,	norman	`				
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	TH	E STR	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	TE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADU.			MAY BE GRADUAL			
₹ Mr			_	ws□	WD 🗌	BORING STARTE	D 11/16/12						_
₩ WL(B	CR)		<u> </u>	WL(AC	ER)	BORING COMPLE	TED 11/16/12		C	AVE IN	N DEPTH		
₩ WL						RIG CME 55	FOREMAN Ar	nador	DI	RILLIN	IG METHOD Air Ro	tary	

CLIENT							JOB#	JOB# BORING#				SHE	ET					
City o	f Au:	stin					3	795		B-5		10	F 1					
PROJECT	NAME f <b>A</b> u:	stin -	-Spi	rinad	lale/US Hwy	290 Water	ARCHITEC	T-ENGINEER										
Impro				90	,									3	TM			
SITE LOC	ATION									ALIBRATED	PENETROMETE DNS/FT <sup>2</sup>	R						
Spring	gdale	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, T	X.				1 2 3 4 5+						
NORTHIN	G			EASTIN	IG	STATION							ROCK QUALITY DESIGNATION & RECOVERY					
10093	682	.088		314 <sup>2</sup>	1642.8470							RQD% 20%	40%	REC.% —	100%			
			SAMPLE DIST. (IN)	2	DESCRIPTION OF N	MATERIAL		ENGLISH U	JNITS	S E		PLASTIC		VATER	LIQUID			
Æ	ġ.	TYPE	DIST	RY (II	BOTTOM OF CASIN	G 👚	LOSS OF	CIRCULATION	1 >100%	EVE.		LIMIT ——		NTENT %	LIMIT %			
ОЕРТН (FT)	SAMPLE NO	SAMPLE TYPE	IP.LE	RECOVERY (IN)	SURFACE ELEVATI	ON 555.5				WATER LEVELS ELEVATION (FT)	BLOWS/6"	$\otimes$		D PENETRATION				
	SAN	SAN	SAN	REC		DITTOM OF CASING LOSS OF CIRCULATION STATE    DIFFACE ELEVATION 555.5								.OWS/FT 30 4 <u>0</u>	50+			
0 _	S-1	ss	18	18	CLAY, Sandy,	Silty, Gravely, I Calcareous De	Light Brov	vn to	綳	<del></del>	3 6	12-⊗		: :	:			
_					Tan, Sun, Will	i Calcaleous De	sposits, (C	)L)		_	6	:			:			
_	S-2	ST	24	24					綳	_			:	: :	:			
_	3-2	31	24	24						_					:			
5 —	S-3	ST	24	24						14.5		:						
-	3-3	31	24	24						<del></del> 550		1.25	:		:			
_	S-4	ss	18	18						_	5 5	12-⊗	:		:			
_										_	7		:		:			
_										_	2	/:			:			
10 —	S-5	SS	18	18					綳	_	3 5	8-⊗			:			
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_										_	2	:	:		:			
15 —	S-6	SS	18	18						_	3 6	9-⊗			•			
15					END OF BOR	ING @ 15.00'			L	<del></del>		•			•			
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20 —									L	_		•			•			
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25									E	_		:	:		:			
									H	<del></del> 530		:	:		:			
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_									H	_		•	:		•			
30 —									F	<del></del>		•	:	: :	:			
	TH	E STRA	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMAT	E BOUNDAF	RY LINES BETV	WEEN S	OIL TYPE	ES. IN-S	SITU THE TRA	NSITION M	AY BE GRADUAL				
₩L				ws 🗌	WD 🗌	BORING STARTE	ED 1'	1/16/12										
₩ WL(B	CR)		<u></u>	WL(AC	CR)	BORING COMPLE	COMPLETED 11/16/12 CAVE IN DEPTH											
₩ WL						RIG CME 55	55 FOREMAN Amador DRILLING METHOD Air Rotary											

CLIENT							JOB#	JOB# BORING#				SHEET				
City o	f Au	stin					3	3795		B-6		1 OF 1				
PROJECT City o	NAME f Au:	stin -	Sp	rinad	lale/US Hwy	290 Water	ARCHITE	CT-ENGINEER								
Impro				3 -									-	TM		
SITE LOC	ATION									CALIBRATED PENETROMETER TONS/FT <sup>2</sup>						
Spring	<u>gdale</u>	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, 7	ГΧ		1 2 3 4 5+						
NORTHIN	G			EASTIN	16	STATION					ROCK QUALITY DESIGNATION & RECOVERY  RQD% ————————————————————————————————————					
10094	013	.937		314	1698.9190 DESCRIPTION OF N	AATEDIAL						20% 40%	60% 80	% 100%		
		ш	Ĵ.	î	DESCRIPTION OF I	//ATERIAL		ENGLISH U		SJ E		PLASTIC LIMIT (	WATER	LIQUID LIMIT %		
Ē	Š.	Y-	DIS	RY (	BOTTOM OF CASIN	G 🔻	LOSS O	F CIRCULATION	1 >100%	LEVE ION (	ا ق	-	•			
ОЕРТН (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>557.1</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"		RD PENETRAT BLOWS/FT	ION		
O DEF	SAI	SAN	SA	REC				BLC	10 20	30 4	0 50+					
	S-1	ST	24	24		[3"], Base Dept					-O- :					
_	3-1	31	24	24	CLAY, Sandy, Drv. Stiff to Ha	Light Brown to ard, With Calcare	Brownish eous Dei	h Yellow, posits.		<del></del>				4.5		
_	S-2	ST	24	24	(CL)	,		, , ,		_		•		-O- :		
_										_	7	14.6	:	4.5		
5 —	S-3	SS	18	18						<del>-</del>	6 7	13 <b>—</b> ——	:	⊢		
_										_	5	12.7		:		
_	S-4	SS	18	18			6 5	11-8-13.1								
_										_		. \ .		•		
_	S-5	ss	18	18						_	6 10	14.1-● 22-⊗		:		
10 —										_	12					
_									_			\				
_									<del></del> 545		: :	\	:			
_										_		: :	\	:		
_	S-6	ss	18	18						_	7 12		29-&	:		
15 —					END OF BOR	ING @ 15.00'				_	17		:	:		
_									F	_						
_									F	<del>-</del> 540		: :		; ; ;		
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									F	_						
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_									F				:	:		
_									F	<del></del> 535			:	:		
_									F	<del>-</del>		: :		: :		
25									F	_		: :		:		
									F	_				:		
_									E			: :		; ; ;		
_									E	<del>-</del> 530				:		
_										_						
30 —									E	_						
_	l							l	L		l l	: :	:	;		
	TH	STRA	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATI	E BOUNDA	ARY LINES BETV	WEEN SO	OIL TYPE	S. IN-S	SITU THE TRANSITION	MAY BE GRAD	UAL.		
Ā Mr				ws 🗌	WD 🗌	BORING STARTE		11/12/12		T						
₩ WL(B	CR)		<u>*</u>	WL(AC	CR)	BORING COMPLE	ETED 1	11/12/12			CAVE	IN DEPTH				
₩ WL						RIG CME 55	5 FOREMAN Amador DRILLING METHOD Air Rotary						otarv			

CLIENT							JOB#	BORING #		SHEET					
City o	f Aus	stin					3795	B-7	,	1 OF 1	50				
PRO IFCT	NAME		Sn	rinad	lale/US Hwy	290 Water	ARCHITECT-ENGINEER	•			L				
Impro	<u>vem</u>	ents	<b>О</b> Р.	gu		Loo Wator					3	TV			
SITE LOC	ATION										D PENETROMETE ONS/FT <sup>2</sup>	R			
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, TX.			1 2	3 4	5+			
NORTHIN	G			EASTIN	IG	STATION				ROCK QUALITY DESIGNATION & RECOVERY					
10094	998	.905		3142	2055.7240				$\rightarrow$	RQD% — — 20% 40%	REC.% —	100%			
		ш	SAMPLE DIST. (IN)	2	DESCRIPTION OF N	MATERIAL	ENGLISH		.		WATER ONTENT %	LIQUID LIMIT %			
E	Ŏ.	Τ	DIST	RY (I	BOTTOM OF CASIN	G 👚	LOSS OF CIRCULATION	<u> 1 200%</u>	´	LIMIT	ONTENT 76				
DЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	<i>I</i> PLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>553.6</b>		WATER LEVELS	BLOWS/6"		RD PENETRATION LOWS/FT				
DEF	SAN	SAN	SAN	REC				BLC	10 20	<u>30 40</u>	50+				
0 _					Asphalt Depth	[3/4"], Base Department [3/4"]	pth [1"] vn to Tan Dry	12	0		:				
_	S-1	SS	18	18	Stiff to Hard, V	Vith Calcareous	Deposits, (CL)		6 5	11-🛇		:			
_	S-2	ss	18	18					5 4 5	9-⊗		:			
_								550	4	<u> </u>		:			
5 —	S-3	SS	18	18					8 7	●		:			
_									4	9,9		:			
_	S-4	SS	18	18			6	16-15.5		:					
										:\:		:			
_	S-5	ss	18	18				545	4 7	19−⊗		:			
10 —		-							12			:			
_									: :\		:				
_										\	: : :				
_									: :	\: :	: :				
_	S-6	ss	18	18				540	12 12	: :	31-⊗	:			
15 —					END OF BOR	ING @ 15 00'			19			:			
					LIND OF BOIL	110 0 10.00		F				:			
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_								<u> </u>		<u> </u>		:			
_										: :		:			
30 —							: :	: :	:						
	THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.														
V 14"	íΗI	= 51K/	ATTE (					MAT BE GRADUAL.							
₩ WL			_	ws 🗌	WD 🗌	BORING STARTE									
₩ WL(B	CR)		<u>+</u>	WL(AC	CK)	BORING COMPLE				CAVE IN DEPTH					
∰ WL						RIG CME 55	FOREMAN Ar	nador	DRILL	DRILLING METHOD Air Rotary					

CLIENT							JOB#	BORING	G #		SHEET				
City of	f Au:	stin					3795		B-8		1 OF 1	5	200		
PROJECT	NAME		-Sp	rinad	lale/US Hwy	290 Water	ARCHITECT-ENGINEER								
Improv				9-								3_	TM		
												D PENETROM ONS/FT <sup>2</sup>	ETER		
Spring	dale	He	igh	s an	d Walnut Pla	ce, Travis Co	ounty, TX.				1 2 3 4 5+				
						STATION					ROCK QUALITY DESIGNATION & RECOVERY  RQD% ————————————————————————————————————				
10095	<u>598</u>	.223		3142	2236.9752 DESCRIPTION OF N	MATERIAI	ENGLISH (	INITS		$\dashv$	20% 40%	60% 80%	% 100%		
		Ä	SAMPLE DIST. (IN)	<u> </u>					ELS (FT)			WATER ONTENT %	LIQUID LIMIT %		
(FT)	E NO	ETYI	E DIS	ERY	BOTTOM OF CASIN	G	LOSS OF CIRCULATION	1 >100%	WATER LEVELS ELEVATION (FT)	9/		•			
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	AMPL	RECOVERY (IN)	SURFACE ELEVATION	on <b>549.6</b>		BLOWS/6"		RD PENETRATI LOWS/FT	ON				
0 _	'S	S)	Ś	32	CLAY, Sandy,	Silty, Tannish B	Frown to Orangish	B	10 20	30 40					
	S-1	ST	24	24	Brown, Dry, V	ery Stiff, With Ca	alareous		_			: :	4.5		
_					Deposits, (CL)				_		<u> </u>	: :	:		
_	S-2	ST	24	24					_		<b>●</b> 15.8	: :	 4.5		
_									<del></del> 545			: :			
5 —	S-3	ST	24	24					_		● 14.4		- <b>O</b> - 4.5		
_									_				4.0		
_	S-4	ST	24	24					—		14.8				
_	0.5	ОТ	0.4						_		40.0	: :			
10	S-5	ST	24	24					<del></del>		13.0-●	: :	- <del></del>		
10									_						
_									_			: :	: :		
_									<del>_</del>			: :	:		
_	S-6	ST	24	24					_			-C	<b>⊢</b> :		
15 —					END OF BOR	INC @ 15 00'			<del>-</del> 535			4.0	)		
_					END OF BOK	ING @ 15.00		F			: :	: :	:		
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_									_						
_									— — 530						
20 —												: :	:		
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25								E	<del>-</del> 525				:		
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_								F	<del>-</del> 520			: :	:		
30 —								L	_		: :	: :	:		
	TH	E STR	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMATI	BOUNDARY LINES BET	WEEN SO	OIL TYPE	ES. IN-S	SITU THE TRANSITION N	MAY BE GRADI	JAL.		
₩L				ws 🗌	WD 🗌	BORING STARTE	D 11/12/12								
₩ WL(B	CR)		<u></u>	WL(AC	CR)	BORING COMPLE	TED 11/12/12		$\neg$	CAVE	IN DEPTH				
₩ WL RIG CME 58							FOREMAN An	nador		DRILLING METHOD Air Rotary					

CLIENT	LIENT								SHEET								
City of	Aus	stin						3795 TECT-ENGINEER		B-9		1	OF 1		500		
PROJECT City of	NAME Aus	stin -	-Spi	ingd	lale/US Hwy	290 Water	ARCHI <sup>*</sup>	TECT-ENGINEER	•			•			ط		
Improv													041155			IETED.	T <sub>N</sub>
						<b>-</b>		<b>T</b> )/		-CALIBRATED PENETROMETER TONS/FT2							
NORTHIN	idale G	<u>не</u>	ight I	s an Eastin	d Walnut Pla	ce, I ravis Co	ounty,	, IX.		1 2 3 4 5+  ROCK QUALITY DESIGNATION & RECOVERY							
10096	กวด	022	ا ۱۰	3143	2392.2805				RQD% — REC.% — 20% 40% 60% 80% 100%								
10000	020	.022	<u> </u>		DESCRIPTION OF N	MATERIAL		ENGLISH	PLASTIC WATER LIQUID								
Ê	ō.	ΓΥΡΕ	JIST.	RECOVERY (IN)	BOTTOM OF CASIN	G 🖿	WATER LEVELS BLOWS/6*					LIMIT CONTENT % LIMIT %					
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	OVEF				WATER LE ELEVATIO							ANDARD PENETRATION		
DEP	SAN	SAN	SAN	REC									20		WS/FT 30 4	0 50	)+
0	S-1	ST	24	24	CLAY, Sandy, Very Hard, (Cl	Silty, Tan to Bro	own, D	ry to Moist,		- 		:	:			4.5	
_					, ,	,				_		:	:				
_	S-2	ST	24	24						_		:	•			<u>-</u>	
_										_			15.4			4.5	
5 —	S-3	ST	24	24						_		● 8.9	:			- <b>(</b> )- 4.5	
_										<del></del>		0.0	:				
_	S-4	ST	24	24						_		7.5-●	:			 4.5	
	٥.	C.T.	24	24						_		45	2.			-0-	
10	S-5	ST	24	24						-		15.	3-●			4.5	
_										— - 		:	:				
							:	:									
										_		:	:				
_	S-6	ST	24	24									23.6	6-		- <b>-</b> -	
15 —					END OF BOR	ING @ 15.00'				_		•	:			4.5	
_					2.12 0. 2011					<del></del>			:				
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20 —										_		•	:				
										<del>-</del> 530		:	:				
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25										_		:	:				
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_										_		:	:				
30									F	_		•	:				
	THI	E STRA	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMATI	E BOUN	DARY LINES BET	WEEN S	OIL TYPE	S. IN-	SITU THE T	RANSITI	ON MA	Y BE GRAD	UAL.	
₩L				ws 🗌	WD 🗌	BORING STARTE		11/12/12									
₩ WL(B	CR)		<u>_</u>	WL(AC	R)	BORING COMPLE	TED	11/12/12			CAVE	IN DEPTH	1				
						RIG CME 55											

CLIENT	LIENT							JOB # BORING #					SHEET					
City of	f Au:	stin						3795 B-10 1 OF 1 ARCHITECT-ENGINEER							500			
PROJECT	NAME A LI	stin .	Sni	ringo	lale/US Hwy	290 Water	ARCHI <sup>*</sup>	TECT-ENGINEER					<u> </u>			U (		
Improv	vem	ents	Орі	iiigo	iaic/OO i iwy	200 Water									3_		<b>)</b> <b>1</b> ™	
SITE LOC	ATION											<del>-</del>	CALIBI		PENETRON IS/FT2	IETER		
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, TX.						1 2 3 4 5+					
NORTHIN	G			EASTIN	NG	STATION							ROCK QUALITY DESIGNATION & RECOVERY  RQD% ————————————————————————————————————					
10096	413	.767		3142	2658.4132 DESCRIPTION OF N	AATERIAI		FNOLIOLI	LINUTO		20% 40% 60% 80% 100%							
		ñ	Ë.	<u>N</u>	DESCRIPTION OF I	MATERIAL		ENGLISH	UNITS	ELS (FT)		PLAS LIMIT			ATER FENT %		QUID MIT %	
(FT)	NON II	∓T		ERY (	BOTTOM OF CASIN	G 🖢	LOSS	OF CIRCULATION	N >100%	LEVE	.9/				•		$\dashv$	
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>540.0</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	STANDARD PENETRATION BLOWS/FT						
0	S/	δ	δ	RE	Gravel Denth	Croyal Donth [49]]								0	30 4	0 50	)+	
_													:			:		
	0.4			10	CLAY, Sandy, Stiff, With Cal	Silty, Tannish E careous Deposit	Brown, s. (CL)	Moist, Very			4	5						
_	S-1	SS	18	18	,		-, (- ,			_	3 2	8						
	S-2	SS	18	18							1 2	6-⊗		•				
5 —				10						<del></del>	2 4			22.4		:		
$\equiv$	S-3	ST	24	24									:	27.0-●		- <del>-</del> -		
_	<b>3</b> -3		24	24								:		27.0		4.5		
_	S-4	ST	24	24						_		:	:			- <del>-</del>		
10 —										530						4.5		
_																		
_							:	:										
										_		:	:			:		
	S-5	ST	24	24						_		:	:			- <b>(</b> )- 4.5		
15 —					END OF BOR	ING @ 15.00'				<del></del> 525		:	:			4.5		
_										_		:	:			:		
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20 —										 520			:			:		
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30 —										<del></del>		:	:			:		
	TH	E STR/	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMATI	E BOUN	DARY LINES BET	WEEN :	SOIL TYPE	S. IN-	SITU THE	TRANSIT	ION MA	Y BE GRAD	UAL.		
₩L				ws 🗆		BORING STARTE		11/12/12										
₩ WL(B	CR)		<u>*</u>	WL(AC	CR)	BORING COMPLE	ETED	11/12/12			CAVE	IN DEPT	Н					
-						RIG CME 55						RILLING METHOD Air Rotary						

CLIENT							JOB# BORING#				SH	IEET						
City of	Aus	stin					3795		B-1	1	1 10	OF 1	5	2				
PROJECT City of	NAME A 1 10	etin .	.Sni	inad	lale/US Hwy	200 Water	ARCHITECT-ENGINEER				•				-			
Improv SITE LOCA				iiigu	laic/OO i iwy	200 Water							3_	Tw				
SITE LOC	ATION						•				<b>-</b> ○- ·	CALIBRATED	PENETROMI DNS/FT <sup>2</sup>	ETER				
Spring	ıdale	e He	iaht	s an	d Walnut Pla	ce. Travis Co	ce, Travis County, TX.						1 2 3 4 5+					
NORTHIN	G		٦	EASTIN	IG	STATION	· · · · · · · · · · · · · · · · · · ·				ROCK QUALITY DESIGNATION & RECOVERY							
10096	810	048	6	3143	3118.8283						RQD% — REC.% ——— 20% 40% 60% 80% 100%							
10000	0.0		Ê		DESCRIPTION OF N	MATERIAL	ENGLISH	UNITS			PLASTIC		VATER	LIQUI	ın			
	o.	/PE	ST. (	) N				\	VELS 1 (FT		LIMIT		NTENT %	LIMIT				
<b>DEPTH (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	BOTTOM OF CASIN	lG 📕	LOSS OF CIRCULATIO	N /1004/	WATER LEVELS ELEVATION (FT)	"9/S		OTANDAD!	DENETRATI	ON.				
ЕРТ	AMP	AMP	AMP	ECO	SURFACE ELEVATI	on <b>522.6</b>			'ATE	BLOWS/6"	$\otimes$		O PENETRATI .OWS/FT	ON	-			
										B	10	20	30 40	50+	$\dashv$			
_	S-1	ST	12	12	CLAY, Silty, S	andy, Dark Brov	vn to Light Brown		_		7.5-●	:	: :	<del>-</del>	-			
_	3-1	31	12	12	to Tan, Moist,	Hard, (CH-CL)			_		7.5	•		4.5				
_	S-2	ST	24	24					<del></del>		:	•		-0-				
_								翢	_		:	20.6	: :	4.5				
5—	S-3	ST	24	24					_			<b>I</b>	: :	<b>-</b> р- :				
_									_		:	17.7		4.5				
	S-4	ST	24	24					_		15.4-	•		- <del>-</del>				
_									<del></del> 515			_		4.5				
	S-5	ST	24	24					_		:	:	: :	:				
10 —	<b>3</b> -3	01	24	24					_		:	:	: :	- <del>-</del>				
10 –									_		:	:		4.5				
_									_			:		:				
_									_ <del></del> 510		:	:		:				
												:						
_	S-6	ST	24	24				翢	_			:	: :	-()- 4.5				
15 —					END OF BOR	ING @ 15.00'	-1	RIN KIKIN			:	•		1.0				
_									_		:	•		:				
_									_ <del></del> 505		:	:		:				
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	ТНІ	F STR	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMATI	E BOUNDARY LINES BET	WEEN	SOII TVI	PES IN-	SITU THE TR	ANSITION M	AY BE GRADI	IAI	-			
₩L				ws 🗆	WD	BORING STARTE			- V-L 111	_0. //4-/	IIIE IIX		JE ONADI		$\dashv$			
VIII2						BORING COMPLE				CAVE	IN DEPTH							
₩ WL					•	RIG CME 55	FOREMAN B	DRILLING METHOD Air Rotary										

CLIENT							JOB#		BORIN	G #		SHEET		
City of	Aus	stin						3795		B-12		1 OF 1		
City of	NAME	stin -	-Sni	inad	lale/US Hwy	290 Water	ARCHIT	3795 ECT-ENGINEER						US I
Improv				90									3	TM
												-O- CALIBRA	ATED PENETRON TONS/FT2	METER
Spring	<u>idale</u>	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 2	•	1 5+
			- 1			OTATION .						ROCK QUALITY  RQD% —	DESIGNATION 8	
10096	991	.092		3143	3358.6475 DESCRIPTION OF N	MATERIAL		ENGLISH	UNITS		$\vdash$	20% 40%		'
		ĴĘ.	ST. (IN)	(N)		_				/ELS I (FT)		PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT %
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	BOTTOM OF CASIN	G 💮	LOSS	OF CIRCULATION	N ∑100%>	WATER LEVELS ELEVATION (FT)	9/S	O STANI	DARD PENETRAT	TON
ЕРТ	AMP	AMP	AMP	ECO	SURFACE ELEVATI	on <b>527.8</b>				VATE	BLOWS/6"	O .	BLOWS/FT	
0 _	O)	o)	0)	IZ.	CLAY, Silty, S	andy, Brown to	Light Bı	rown to		<u>&gt; ш</u> -	Ш	10 20 15.9	30 4	0 50+
_	S-1	ST	24	24	Tannish Oran	ge, Dry, Hard, (C	CH-CL)					•		- <b>○</b> - 4.5
										525			: :	
	S-2	ST	24	24						- -		13.9		4.5
5 —	S-3	ST	24	24						_				<b>-</b> ∩-
	<b>3</b> -3	J1	24	24						_		12.0	: : :	-\(\rightarrow\)- 4.5
_	S-4	ST	24	24						_		12.2-	<u>:</u>	<b>—</b> O-
_										<del></del>			:	4.5
	S-5	ST	24	24						_		13.8	:	<b>-</b>
10 —										_		: :	:	4.5
										_			:	
										_				
_										<del></del> 515 -				
_	S-6	ST	24	24						_		: :	-(	)- 0
15 —					END OF BOR	ING @ 15.00'				_		: :		
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3									þ	- <del></del> 510		: :	: :	:
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30 —									F	_			:	
	THI	E STRA	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMATI	E BOUND	DARY LINES BET	WEEN S	OIL TYPE	ES. IN-S	SITU THE TRANSITIO	ON MAY BE GRAD	DUAL.
₩L				ws 🗌	WD 🗌	BORING STARTE		11/10/12						
₩ WL(B	CR)		<u></u>	WL(AC	CR)	BORING COMPLE	ETED	11/10/12		+	CAVE	IN DEPTH		
₩ WL			-			RIG CME 55		FOREMAN Br	adlev	-+	DRILI	ING METHOD Air F	Rotarv	

CLIENT							JOB#	BORING	ê #		SHEET		
City of	f Au:	stin					3795		B-13		1 OF 1		
PROJECT.	NAME		-Sn	ringo	lale/US Hwy	200 Water	ARCHITECT-ENGINEER				1		US I
Impro				migo	iaie/OO i iwy i	230 Water						3.	TM
SITE LOC	ATION											D PENETROI ONS/FT2	METER
Spring	dale	e He	ight	ts an	d Walnut Pla	ce, Travis Co	ounty, TX.				1 2	3	4 5+
NORTHIN	G		Ĭ	EASTIN	IG	STATION	,,				ROCK QUALITY DE	-	' '
10094	915	.014	.5	3142	2668.4572						RQD% — — 20% 40%	REC.%	 0% 100%
			<u> </u>		DESCRIPTION OF N	MATERIAL	ENGLISH (		ω <u>-</u>		PLASTIC	WATER	LIQUID
_	ō.	YPE	JIST.	N)	BOTTOM OF CASIN	G 🖿	LOSS OF CIRCULATION	J >100%			LIMIT CO	ONTENT %	LIMIT %
Ή Έ	LE N	).E.1	밀	VER					ATIO	.9/S/	∨ STANDAF	RD PENETRA	TION
DЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	SURFACE ELEVATION	on <b>533.6</b>			WATER LEVELS ELEVATION (FT)	BLOWS/6"		LOWS/FT	10 50+
0 _		•			CLAY, Silty, S	andy, Dark Brov	vn to Light Brown				12.9	30 -	10 30+
_	S-1	ST	24	24	to Tan, Dry to	Moist, Hard, (Ch	H)		_		•	•	-\-\- 4.5
_									_			:	
_	S-2	ST	24	24					<del>-</del> 530		13.0	÷:	- <u>O</u> - 4.5
_									_			:	: :
5 —	S-3	ST	24	24					_		<b>•</b> 2.5	:	
_	C 4		40	10					_	6	: :		
_	S-4	SS	18	18					_	8 8	●-3.8 16-⊗		
_									<b>-</b> 525				
_	S-5	ss	18	18					_ 525	10 14		<u> </u>	÷
10 —									_	18	2	6.6 32	· · · · · · · · · · · · · · · · · · ·
_									_				: : : :
_												:	
_									_ 520			:	
_	S-6	ST	24	24					- 520				- <b>O</b> - 4.5
15 —					END OF BOR	ING @ 15.00'			_			:	4.5
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_								F	<del>-</del> 515				
20 —								F	_			:	
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25								F	<b>-</b> 510				: :
25 —								F	_			:	: :
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30 —								F	_			:	
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	TH	E STR/	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	BOUNDARY LINES BET	WEEN SC	OIL TYPE	S. IN-	SITU THE TRANSITION N	MAY BE GRAI	DUAL.
₩L				ws□	WD 🗌	BORING STARTE	D 11/10/12						
Ψ WL(B	CR)		<u>*</u>	WL(AC	CR)	BORING COMPLE	TED 11/10/12		$\dashv$	CAVE	IN DEPTH		
₩ WL	·												

CLIENT							JOB#		BORIN	IG#		SHEET			
City of	· Aus	stin						3795 TECT-ENGINEER		B-14		1 OF 1			
PROJECT City of	NAME Aus	stin -	-Spi	ingd	lale/US Hwy	290 Water	ARCHI	TECT-ENGINEER	•			•			
Improv	<u>/em</u>	<u>ents</u>											1		тм
												-()- CALIBRAT	ED PENETROM TONS/FT <sup>2</sup>	IETER	
Spring NORTHIN	<u>Idale</u>	e He	ight I	s an	d Walnut Pla	ce, Travis Co	ounty,	<u>, TX.</u>				1 2 ROCK QUALITY I	3 4		v
					2210.7456							RQD% — -	REC.%		
10095	176	.079	<u>4  </u> Ê	3142	DESCRIPTION OF N	MATERIAL		ENGLISH	UNITS			20% 40% PLASTIC	60% 80 WATER	% 100% LIQI	
(	o.	YPE	IST. (	(IN)	DOTTOM OF CACIN		1000	OF CIRCULATION	u Sma	WATER LEVELS ELEVATION (FT)			CONTENT %	LIMI	
н (FT	LE N	'E T	LE D	RECOVERY (IN)	BOTTOM OF CASIN		LUSS	OF CIRCULATION	N / W//	R LE	"9/S/	⊗ STANDA	ARD PENETRAT	ION	
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECC	SURFACE ELEVATION	on 550.9				WATER LEVELS ELEVATION (FT)	BLOWS/6"		BLOWS/FT 30 4		
0 _					Asphalt Depth	[4"], Base Dept	h [18"]			550		1,0 2,0		0 001	
$\equiv$					to Tan, Dry, H	andy, Dark Brov ard, (CL)	wn to L	ignt Brown.							
	S-1	ST	24	24						_			•	<b>-</b>	
_												12.0	:	4.5	
5 —	S-2	ST	24	24						<u> </u>		10.3-	-	<del>-</del> O-	
										<del></del>		: :		4.5	
_	S-3	ST	24	24						_		9.3-	<b>-</b>	•	
										_		2.0			
_	S-4	ST	24	24						_				 4.5	
10 —										_			:	4.0	
_										<del></del>		ļ i		:	
_										_					
_	0.5	ОТ.	0.4	0.4								: :	•	<u>.</u>	
15 —	S-5	ST	24	24								<u> </u>	:	4.5	
13 _					END OF BOR	ING @ 15.00'			-	535					
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	THI	E STRA	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMAT	E BOUN	DARY LINES BET	WEEN S	SOIL TYPE	S. IN-	SITU THE TRANSITION	MAY BE GRAD	UAL.	
≟ Mr				ws□	WD	BORING STARTE	D	11/10/12							
₩ WL(B	CR)		<u></u>	WL(AC	ER)	BORING COMPLE	ETED	11/10/12			CAVE	IN DEPTH			
₩ WL						RIG CME 55		FOREMAN Br	adlev		DRILI	LING METHOD Air RO	otarv		

CLIENT							JOB#	BORING	G #		SHEET	- I			
City of	f Aus	stin					3795		B-15		1 OF 1		5	<u> </u>	
PRO IFCT	NAME		-Sp	ringd	dale/US Hwy	290 Water	ARCHITECT-ENGINEER					7 !	اط		
Improv SITE LOC	vem	<u>ents</u>	<u></u>										3		, 1.
											-O- CALIBRA	TED PENET TONS/FT2		:TER	
Spring	<u>ıdale</u>	<u>: Не</u>	ight	ts an	d Walnut Pla	ice, Travis Co ISTATION	ounty, TX.			_	1 2	3	4	5	
			- 1			GIATION					ROCK QUALITY  RQD% —		ION & I	RECOVE	RY
10095	733	.614	_	314	1874.3663 DESCRIPTION OF N	MATERIAI	ENGLISH	PTIMITS		$\dashv$	20% 40%		80%	6 100	1%
		Щ Щ	SAMPLE DIST. (IN)	<u> </u>	DECORAL FIGHT OF IN	WILLIAM	LINGLIGHT		ELS (FT)		PLASTIC LIMIT	WATER CONTENT	%		QUID MIT %
(FT)	E NO.		E DIS	ERY	BOTTOM OF CASIN	ig 🔻	LOSS OF CIRCULATION	1 >100%	LEV	9/		•			4
DEРТН (FT)	SAMPLE	SAMPLE TYPE	MPL	RECOVERY (IN)	SURFACE ELEVATION	ION 562.6			WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STAND	DARD PENET BLOWS/F1		NC	
0 _	ŝ	ŝ	ŝ	<u> </u>	Asphalt Depth	n [2"], Base Deptl	h [4"]	X	> <u>ii</u>	<u> </u>	10 20	30	40	50	+
_	S-1	ST	24	24	CLAY, Sandy,	, Silty, Tannish B	Brown, Dry, Hard,		-		<u> </u>	:	:	:	
_				-	vvith Calcareo	ous Deposits, (CL	-)		 560		: :	:	:	•	
_	S-2	ST	24	24					- 300		● 14.2	:	:	 4.5	
_									-			:	:	1.0	
5 —	S-3	ST	24	24							16.1	:	:	- <del>-</del>	
_				$\vdash$							: :			4.5	
_	S-4	ST	24	24					- 		15.0-●	-( 3	)- .5	:	
_												:			
-	S-5	ST	24	24							13.9 ●	:	:	 4.5	
10 —									_			:	:	:	
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$\equiv$									550			:	:	:	
_	S-6	ST	24	24					_			:	:	:	
15 —	3-0		24	24					_			:	:	4.5	
_					END OF BOR	ING @ 15.00'			_		: :	:	:	:	
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	TUI	E STD	ATIEI/	^ATION	I I INIES DEDDESENT	T THE ADDDOVIMAT	E BOUNDARY LINES BET	WEENS	OII TVDE	S IN S	SITU THE TRANSITION	NI MAV DE C	SDADI	101	
Ā Mr				ws 🗆		BORING STARTE		***************************************		.0. 114 0	ATO THE TRUNCTION		70100	712.	
	CR)								$\rightarrow$	CAVE	IN DEPTH				
Ţ WL	BORING COMPLETED 11/12/12 CAVE IN DEPTH  RIG CME 55 FOREMAN Amador DRILLING METHOD Air Rotary														

CLIENT         JOB #         BORING #         SHEET           City of Austin         3795         B-16         1 OF 1													
City of	f Au:	stin					3795	В	-16		1 OF 1	5	
PROJECT.	NAME	:	-Sni	rinad	lale/US Hwy	200 Water	3795 ARCHITECT-ENGINEER						U V
Impro				iiigu	laic/OO i iwy	200 Water						3	TM
SITE LOC	ATION										-O- CALIBRAT	ED PENETRON TONS/FT <sup>2</sup>	IETER
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, TX.				1 2	3 4	5_+
NORTHIN	G		ا	EASTIN	IG	STATION	,				ROCK QUALITY I		'
10095	797	.308	6	3142	2605.0244						RQD% — - 20% 40%	— REC.% 60% 80	<del></del> % 100%
					DESCRIPTION OF N	MATERIAL	ENGLISH		_		PLASTIC	WATER	LIQUID
_	ō.	YPE	JIST.	N)	BOTTOM OF CASIN	G 🖿	LOSS OF CIRCULATION	7 200%) S	Б Г		LIMIT (	CONTENT %	LIMIT %
Ή F	N EIN	LE T	J J	VER			2000 01 0111002111101		ATIO	.9/S/	∨ STAND/	RD PENETRAT	ION
DЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	SURFACE ELEVATION	ON 529.2		WATER LEVELS	ELEVATION (FT)	BLOWS/6"	10 20	BLOWS/FT 30 4	
0 _					CLAY, Sandy,	Silty, Brown, Dr	y, Hard, (CL)		_		10 20	30 4	4.5
_	S-1	ST	24	24									
_												:	
_	S-2	ST	24	24							14.1	: :	-O- 4.5
_									525			:	:
5 —	S-3	ST	24	24							13.1-● ├──	:	<del>- </del>  -
_													4.5
_	S-4	ST	24	24							13.7-●		- <u>O</u> - 4.5
_												:	
_	S-5	ST	24	24				-	520		14.2-●		- <u>O</u> - 4.5
10 —													
_												:	:
_												:	:
_												:	:
_	S-6	ST	24	24					515				- <b>\( -</b> 4.5
15 —					END OF BOR	ING @ 15.00'							4.5
_												:	:
_								<u> </u>				:	:
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_								<u> </u>	510				
20 —												:	:
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	TH	E STR/	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	BOUNDARY LINES BET	WEEN SOIL	TYPE	ES. IN-S	SITU THE TRANSITION	MAY BE GRAD	UAL.
₩L				ws□	WD 🗌	BORING STARTE	D 11/12/12						
₩ WL(B	CR)		<u></u>	WL(AC	R)	BORING COMPLE			$\dashv$	CAVE	IN DEPTH		
₩ WL	·												

CLIENT							JOB#		BORIN	IG #		SHEET				
City of	· Aus	stin						3795		B-17		1 OF	1			
City of	NAME A L I	stin .	Sni	inac	lale/US Hwy	290 Water	ARCHIT	3795 FECT-ENGINEER	2				-		U S	
Improv				iiigo	iaic/OO i iwy	200 Water								3 <u></u>		)    <sub>10</sub>
SITE LOC	ATION											-O- CALIE		PENETROM	IETER	
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.					2	3 4		
NORTHIN	ن			EASTIN	lG	STATION						ROCK QUAL RQD% -	ITY DES	SIGNATION 8 REC.%	RECOVE	RY
10096	097	.749		3142	2766.5934 DESCRIPTION OF N	AATERIAI		FNOLIOL	LINUTO				0%	60% 80	% 100	%
		ñ	J.	(NE	DESCRIPTION OF I	MATERIAL		ENGLISH	UNITS	ELS (FT)		PLASTIC LIMIT		VATER NTENT %		QUID //IT %
(FT)	NO	∓T	SIO =	ERY (	BOTTOM OF CASIN	G 🖢	LOSS	OF CIRCULATIO	N >100%	LEVE	.9/			•		+
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>525.1</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ ST/		) PENETRAT OWS/FT	ION	
0	8/	/S	Ś	R	CLAY Sandy	Silty, Brown, Dr	rv Har	4 (CL)		<u>≩ ଘ</u> 525	B	10	20	30 4	Υ-	+
	S-1	ST	24	24	ob (1, canay,	Only, Brown, Br	y, riai	u, (OL)		_			:		4.5	
										_		•	:	:		
_	S-2	ST	24	24						_		13.6	:	:	 4.5	
_										_		13.0	:	:	4.5	
5 —	S-3	ST	24	24						<del></del>		● 14.2	:	:		
_										_			:		4.5	
_	S-4	ST	24	24						_		15.2-		Ė	—⊖ 4.5	
_										<del>-</del>		:	•	:		
10	S-5	ST	24	24						<del>_</del>		:		:	-()- 4.5	
10										<del></del>		:	:	:	:	
										_		:	:			
_										_			:			
	S-6	ST	24	24						_					<b>-</b> ○-	
15 —										_ <del></del> 510		:	•	: :	4.5	
_					END OF BOR	ING @ 15.00				_			:	:		
_										_		:	:	:	:	
_										_		:	:	:		
_										_		: : :	:			
20 —										505		:	:	:	:	
										<del>-</del>		:	:	:		
										_			:			
_										_			:			
25												•	:	:		
25 —										500		: :	•	:		
_										_		: :	:	:	:	
_										_		: : :	:			
_										_				:		
-										_		:	:			
30 —										<del></del>		:	:	:		
	THI	E STR/	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMATI	E BOUNI	DARY LINES BE	TWEEN S	SOIL TYPE	S. IN-S	SITU THE TRANSI	TION M	AY BE GRAD	UAL.	
₩L				ws 🗆	WD 🗌	BORING STARTE		11/12/12								
₩ WL(B	CR)		<u>*</u>	WL(AC	CR)	BORING COMPLE	TED	11/12/12		+	CAVE	: IN DEPTH				
₩L RIG CME 55								FOREMAN A	mador			ING METHOD A	ir Rota	nrv		

CLIENT							JOB#		BORII	NG#		SHEET				
City of	Aus	stin						3795 ECT-ENGINEER		B-18		1 OF 1		5	<u> </u>	
PROJECT City of	NAME Aus	stin ·	-Sp	ringd	lale/US Hwy	290 Water	ARCHIT	ECT-ENGINEER				•				
Improv SITE LOCA	/em	<u>ents</u>										OALIDE	ATED DE	NETRONI	TED	1 №
						<b>.</b>		T)/				-O- CALIBR	RATED PE TONS		ETER	
Spring NORTHING	<u>Idale</u>	e He	igh I	ts an Eastin	d Walnut Pla	ce, Travis Co	ounty,	IX.				1 2 ROCK QUALIT			RECOVE	
10096	388	572	,	3143	2260.6187							RQD% — 20% 409	- —	REC.%		
10000	000	.072	<u> </u>		DESCRIPTION OF I	MATERIAL		ENGLISH	UNITS	w C		PLASTIC	WAT	'		QUID
Ê	ġ.	ΓΥΡΕ	JIST.	RECOVERY (IN)	BOTTOM OF CASIN	ıg 🖿	LOSS	OF CIRCULATIO	N >100%	WATER LEVELS ELEVATION (FT)		LIMIT	CONTE			MIT % ⊢
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	OVEF	SURFACE ELEVATI					TER LI	BLOWS/6"	⊗ STAN	IDARD PE		ON	
	SAN	SAN	SAN	REC					Normonia	WAT	BLO	10 20	BLOW:		50	+
0 _	S-1	ST	24	24	CLAY, Sandy	Silty, Brown, D	ry, Harc	d, (CL)				: :	:	:	4.5	
	S-2	ST	24	24						_		•	:	:	<del>-</del>	
$\exists$										560		11.8	:	:	4.5	
5 —	S-3	ST	24	24								42.2			 4.5	
_												12.2	:	:	4.5	
$\exists$	S-4	ST	24	24								12.5-●	:	:	 4.5	
=										<del></del>						
10	S-5	ST	24	24						<del></del>		14.2-●	:	:	-O- 4.5	
10																
_																
										_		: :	:	:		
	S-6	ST	24	24						550			:	:	<del>-</del>	
15 —					END OF BOR	ING @ 15.00'							:	:	4.5	
$\exists$					LIND OF BOIN	1110 @ 15.00						<u>:</u> :	:	:		
													:	:		
_																
										<del></del>			:	:	:	
20 —										_			:	:		
=										_			:	:		
25 —												: :	:	:		
										540			:	:		
25 —													:	:		
										_		: :	:	:		
													:	:	:	
										_			:	:		
-										535			:	:		
30										_		· · · · · · · · · · · · · · · · · · ·	:	:		
	'		ļ						'				•	•	•	
∇ ,	THE	E STRA	ATIFIC		LINES REPRESENT				WEEN	SOIL TYPE	S. IN-	SITU THE TRANSITI	ON MAY E	BE GRADU	JAL.	
≟ Mr				ws 🗌	WD 🗌	BORING STARTE		11/12/12								
— WL(B	CR)		<u></u>	WL(AC	CR)	BORING COMPLI	ETED	11/12/12			CAVE	IN DEPTH				
₩ WL						RIG CME 55		FOREMAN A	mador	. [	DRILI	LING METHOD Air	Rotary			

CLIENT							JOB#	BORING	#		SHEET		
City of	f Au:	stin					3795		B-19		1 OF 1	5	
PROJECT.	NAME		-Sn	ringd	lale/US Hwy	200 Water	ARCHITECT-ENGINEER				, , , , ,	_ <b>_</b>	<del>G</del> C
Impro				migo	iaic/OO i iwy	200 Water						5	TM
SITE LOC	ATION											ED PENETROM FONS/FT <sup>2</sup>	IETER
Spring	dale	e He	ight	ts an	d Walnut Pla	ce, Travis Co	ounty, TX.				1 2	3 4	1 5 <sub>.</sub> +
NORTHIN	Ğ			EASTIN	IG	STÁTION					ROCK QUALITY D		•
10096	586	.986	7	314	1798.8963						RQD% — - 20% 40%	REC.% 60% 80	% 100%
					DESCRIPTION OF N	MATERIAL	ENGLISH (		n 🗀		PLASTIC	WATER	LIQUID
_	ō.	YPE	JIST.	N)	BOTTOM OF CASIN	G 🖿	LOSS OF CIRCULATION	J 700%	, Z		LIMIT C	ONTENT %	LIMIT %
Ή F	N EIN	LE T	밀	VER			2000 01 011100211101	·	ATIO	.9/S/	⊗ STANDA	RD PENETRAT	ION
DЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	SURFACE ELEVATION	on 567.3		T X X X X X X X X X X X X X X X X X X X	WATEN LEVELS	BLOWS/6"		30 4	
0 _		•			CLAY, Sandy,	Silty, Brown to	Tan, Moist to Dry,				10 20	30 4	4.5
_	S-1	ST	24	24	Hard, With Ca 	alcareous Depos	sits, (CL)		-			:	
_									- 565			:	
_	S-2	ST	24	24					-		20.3	:	-O- 4.5
_									-		: :		
5 —	S-3	ST	24	24					-		• 7.6		- <del></del>
_									-			•	4.0
_	S-4	ST	24	24					- 560			:	 4.5
_									_			:	
_	S-5	ST	24	24					_				 4.5
10 —									-				1.0
_									-			:	
_									- 555			:	
_									_			:	
_	S-6	SS	18	18					_	16 16		34-⊗	
15 —					END OF BOR	ING @ 15.00'			_	18		:	
_								E	_				
_									- 550			:	
_								F	_			:	
_									_				
20 —								F	_			:	
_									_				
_								L	<del>-</del> 545				
25									_				
_								L	_		<u> </u>	:	
25 —									_			:	
_									_				
_								E	- 540			:	
_								L	_			:	
_								L	_				
30 —								L	_		: :		
_	l			1	1		I	ı		ı İ	: :	:	:
	TH	E STR/	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMATE	E BOUNDARY LINES BET	WEEN SO	IL TYPE	S. IN-S	SITU THE TRANSITION	MAY BE GRAD	UAL.
₩L				ws□	WD 🗌	BORING STARTE	D 11/12/12		T				
₩ WL(B	CR)		<u>*</u>	WL(AC	CR)	BORING COMPLE	TED 11/12/12			CAVE	IN DEPTH		
₩ WL	·												

CLIENT							JOB#		BORING	3 #		SHEET		
City o	f Aus	stin						3795		B-20		1 OF 1	50	
PROJECT	NAME f <b>A</b> LL	stin -	Sn	rinad	ale/US Hwy	290 Water	ARCHIT	3795 ECT-ENGINEER					<b>       </b>	
Impro				ingu	laic/OO I IWy	200 Water							4_	TM
													D PENETROMETEI DNS/FT <sup>2</sup>	₹
Spring	dale	<u>Не</u>	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 2	3 4	5+
						STATION						ROCK QUALITY DE RQD% — —	SIGNATION & REC REC.%	COVERY
10096	095	<u>.159</u>		3141	1522.0306 DESCRIPTION OF N	AVEDIVI		ENGLISH (	INITO			20% 40%	60% 80%	100%
		Й	Ë.	Î.	DEGGIAII TIGIT GI II	MATERIAL				(FT)			NATER NTENT %	LIQUID LIMIT %
(FT)	E NO	E TY	E DIS	ERY	BOTTOM OF CASIN	G 🔻	LOSS	OF CIRCULATION	1 200%	I LEV	9/		•	$\longrightarrow$
<b>DEPTH (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>561.0</b>			ĺ	WATER LEVELS ELEVATION (FT)	BLOWS/6"		D PENETRATION LOWS/FT	
0 _			/S	32	CLAY, Sandy,	Silty, Brown to	Tan. St	tiff to Hard.		≶	4	10 20	30 40	50+
_	S-1	SS	18	18	Dry, (CL)	,,	,	,		<del></del> 560	5 4	9-⊗ ●-13.1	: :	:
_		SS	40	18						_	3 4	<b>A</b>		:
_	S-2	33	18	10						_	7	6.8		
	S-3	ss	18	18						_	3 9	•	_i :	:
5—										_	8	6.0 17		:
_	S-4	ss	18	18						<del></del> 555 	9 14	8.1-	31 ⊗	:
_										_	17	<u> </u>	:\:	:
_	0.5		40	10						_	11	20.0	loo	:
10 —	S-5	55	18	18						_	14 24	8.3	<del> </del> 38-⊗	:
_										<b>-</b> 550				
_										_				
_										_		: :	:/ :	:
_	S-6	ss	18	18						_	13 15	10.2-	<del>-</del> → -	:
15 —					END OF BOR	ING @ 15.00'				_	15		30	
_									F	<del></del> 545		: :	: :	:
_									F	_				:
									F	_				
									F	_		: :		:
20									E	— <del>–</del> 540		: :	: :	:
_														:
_										_				
25									F	_		: :		:
25 —									F	_				
_										<del>-</del> 535				
_									F	_		: :		•
_									E	_		: :	: :	:
									F	_				:
30 —									F	_				
	TLU	= QTD /	TIEI	'ATION'	LINES DEDDESENT	THE APPROVIMATI	E BOLING	JARV I INIES DET	WEEN SC	חו דערי	=Q INI 9	SITU THE TRANSITION M	IAV RE CDADUAL	
₩L	IH	_ SIKF		ws 🗌	WD	BORING STARTE		11/08/12	WEEN SC	JIL I TPI	_O. IIV-	OLLO THE TRANSTHON N	IA I DE GRADUAL.	
	CD)									$\dashv$	CA1.7	IN DEDT!!		
₩ WL(B	CK)		<u>+</u>	WL(AC	к)	BORING COMPLE	ΙΕD	11/08/12		$\dashv$		IN DEPTH		
₩ WL						RIG CME 55		FOREMAN Br	adley		DRIL	LING METHOD Air Rota	ary	

CLIENT							JOB#		BORIN	G #		SHEET		
City of	f Au:	stin						3795		B-21		1 OF 1	5	20
PROJECT City of	NAME Au:	stin ·	-Sp	ringo	lale/US Hwy	290 Water	ARCHI	TECT-ENGINEER	•					
Improv	vem	<u>ents</u>										04410047	D DEVETORY	TTED.
				1	1.W. L. ( DI	<b>T</b> : 0		<b>T</b> \/					ED PENETROM TONS/FT <sup>2</sup>	EIER
NORTHIN	idale G	<u> не</u>	<u>igh</u>	is an Eastin	d Walnut Pla	ce, Travis Co	ounty,	, IX.				1 2 ROCK QUALITY D	3 4 ESIGNATION &	
10094	.895	652	2	314	1204.9967							RQD% — - 20% 40%	REC.%	
10001	000	.002	<u>Z</u>		DESCRIPTION OF N	MATERIAL		ENGLISH		w C		PLASTIC	WATER	LIQUID
Ē	ō.	ΥPE	JIST.	RECOVERY (IN)	BOTTOM OF CASIN	ig 🖿	LOSS	OF CIRCULATION	1 >100%	WATER LEVELS ELEVATION (FT)			ONTENT %	LIMIT %
<b>DEРТН (FT)</b>	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	OVER	SURFACE ELEVATI					ER LI	BLOWS/6"		RD PENETRAT	ION
	SAN	SAN	SAN	REC					DNISON DNI	WAT	BLO	1 <u>0</u> 20	30 4 <u>0</u>	) 50+
0 _	S-1	ST	24	24	Dry, Very Stiff	Silty, Dark Brow to Hard,With Ca	wn to T alcarec	an,Moist to ous		<u>-</u>		15.4		-\rightarrow- 4.5
	S-2	SS	18	18	Deposits, (CH	-CL)				- -	5	8.9-●⊗ ├──		4.5
_				40						— - — 555	6	• 170		:
5 —	S-3	SS	18	18						- -	9	● 17-⊗ 7.8		:
_	S-4	SS	18	18						<u>-</u> -	9 15 19	8.9-	→ ⊗	
	S-5	SS	18	18						 550	5 5	9.6-●   ₩		4
10										- - -	13			· :
_										<u>-</u>				
_	-									- -	14			
15 —	S-6	SS	18	18	END OF BOR	ING @ 15 00'				<del></del>	20 25	9.8-●		I5-⊗ :
					LIND OF BOIL				F	_				:
_									þ	-				:
_									F	- -		<u> </u>	: :	:
									F	<del></del>				:
20 —									E	_			: :	:
3									E	_		: :	: :	: :
25									F	_		: :		:
										_				•
25 —									F	<del></del> 535				
									E	_				:
_									F	_				:
_									E	_			: :	:
_									E	_				:
_									E	<del></del> 530				
30 —									⊦	_		: :	: :	• •
	TH	E STR	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMAT	E BOUN	DARY LINES BET	WEEN S	OIL TYPE	S. IN-	SITU THE TRANSITION	MAY BE GRAD	UAL.
— WL				ws□		BORING STARTE	D	11/08/12						
₩ WL(B	CR)		Ţ	WL(AC	CR)	BORING COMPLE	ETED	11/08/12				IN DEPTH		
₩ WL RIG CME 55								FOREMAN Br	adlev	1	DRIL	LING METHOD Air Ro	tarv	

CLIENT							JOB#		BORIN	NG#			SHEE	Т			ļ
City of	f Au:	stin						3795		B-:	22		1 OF	2	5	<u>n</u>	
PROJECT	NAME Au:	stin ·		ringd	lale/US Hwy	290 Water	ARCHI	TECT-ENGINEE	ER								) I₁∞
													-O- CAI	IBRATED TO	PENETRON DNS/FT <sup>2</sup>	METER	
Spring NORTHIN	<u>idale</u> G	He	ight I	s an	d Walnut Pla	ce, Travis Co	ounty	<u>, TX.</u>					1	2	-	4 5+	
			- 1										RQD%		SIGNATION REC.%		
10093	039	.554	<u> </u>	3143	3604.9016 DESCRIPTION OF N	MATERIAL		ENGLIS	H UNITS				20%	40%	•	0% 100	
_	o.	/PE	IST. (I	(N)	DOTTOM OF OACIN			OF CIRCULAT	ION (me)	VELS	ELEVATION (FT)		PLASTIC LIMIT		NATER NTENT %		QUID IIT %
H (FT	LE NO.	빌	LE D	RECOVERY (IN)	BOTTOM OF CASIN		LUSS	OF CIRCULAT	ION ZWAZ	R LE	ATIO	.9/S/	⊗ s	TANDARI	D PENETRAT	TION	1
ОЕРТН (FT)	SAMPLE	SAMPLE TYPE	SAMPLE DIST.	RECC	SURFACE ELEVATI	on <b>504.5</b>				WATER LEVELS	ELEV	BLOWS/6"	10	BL 20	.OWS/FT	10 50+	_
0 _	S-1	SS	18	18	CLAY, Sandy,	Silty, Brown to	Dark E	Brown to				1 1	⊗-3	<u> </u>	<u> </u>	0 301	
_				-		ow, Moist, Soft to eposits, (CH-CL		vvitn		_		2		:	:		
_	S-2	ST	24	24						_						- <u></u> - 4.5	
_										_ <del></del> 50	00		:	:	:	4.5	
5 —	S-3	ST	24	24										-( 2.	ე- .75		
_	S-4	ST	24	24						_				:	 3.25		
_	S-5	ST	24	24										:	-0-		
10										— 49 —	95				3.25		
_										_			:	:	:	: :	
_										_				:	:		
_	0.0	ОТ.	0.4	0.4	-Sandv Grave	I Layers 14' to 2	4'			_ <del>∀</del>							
15 —	S-6	ST	24	24		,				<del>-</del> 	90		.5 H	24.8	3		
										_				:	:		
_														:	:		
_										_							
	S-7	SS	18	18							85	1 3 5	8-⊗. ⊢	24.6	<u>:</u>		
20 —										_				24.8	) : :	: :	
_										_			:				
_										_			: :	:	\ <u>`</u>	: :	
_	S-8	ss	18	18	SHALE, Gray						_	3 24	:	:	. 4	<b>(0</b>	
25 —					Ornice, Gray					48 	80	16	:	:	:	<u> </u>	
_										_			:	:	:		
_										_			: :	:	:	:\:	
_										_			:	:	:	. \ .	
30 —	_S-9	SS	5	5						47 47	75	50/5				50/5-	
-				1	l				<u> </u>		I	CC	) Ntinue	D OI	N NEX	T PAC	ΞE.
	TH	E STR/	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMAT	E BOUN	DARY LINES B	ETWEEN :	SOIL T	YPE	S. IN-S	SITU THE TRAN	SITION M	AY BE GRAI	DUAL.	
₩L				ws 🗆		BORING STARTE		11/14/12			T						
Ψ WL(B			<u>*</u>	WL(AC	CR)	BORING COMPLE	ETED	11/14/12			$\dagger$	CAVE	IN DEPTH				
₩ WL						RIG CME 55		FOREMAN	Amador		T	DRILI	LING METHOD	Air Rota	ary		

CLIENT							JOB#		BORIN	NG #		SHEET	$\neg \tau$		
City of	Aus	stin						3795		B-22		2 OF 2	<u>.</u>	5	
PROJECT	NAME ALI	stin .	-Sn	ringo	lale/US Hwy	290 Water	ARCHI	3795 TECT-ENGINEER							US I
Improv	vem	ents	<b>Ο</b> Ρ	illigo	iaic/OO i iwy	200 Water								<i>3</i>	TM
SITE LOC	ATION											-O- CALIB	RATED TO	PENETRON NS/FT <sup>2</sup>	METER
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 :	2	3 4	1 5+
NORTHIN	G			EASTIN	lG	STATION						ROCK QUALI RQD% -	TY DES	IGNATION 8 REC.%	
10093	839	.554	_	3143	3604.9016 DESCRIPTION OF N	AATERIAI		FNOLIOU	LINUTO				)%	60% 80	
		ñ	T. (IN)	<u> </u>	DESCRIPTION OF I	MATERIAL		ENGLISH	UNITS	SI:S		PLASTIC LIMIT		ATER ITENT %	LIQUID LIMIT %
(FT)	NO.	∓T	E DIS	ERY (	BOTTOM OF CASIN	G 🖢	LOSS	OF CIRCULATION	V >100%	LEVE	.9/	-		•	-
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>504.5</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STA		PENETRAT DWS/FT	TION
	S	S	\S	R.	SHALE, Gray					_ _ ¾ <u>⊒</u>	B	10 2	20	30 4	0 50+
_					Ornite, Oray					_		:	:	:	
_										_		:	:		
										_		:	· :	:	
35 —	S-10	SS	4	4						<del></del>	50/4	: :	:		50/4−⊗
										_		:	:	:	
_										_		:	:		
										_		:	:	:	
_										 465		:	:		
40 —	S-11	SS	2	2						— 465 —	50/2	• • •	:	:	50/2-⊗
_												: :	:		
												:	:	:	
_												:	:		
_	0.40	00	_							460	50/6	:	:		50/0
45 —	<u>S-12</u>	- 55	_6_	6							30/0	:	:		50/6−⊗
_										_		• • •	:	:	
_												:	:	:	
										_		:	:		
50	S-13	SS	6	6						455	50/6	:	:		50/6−⊗
50 —					END OF BOR	ING @ 50.00'				_		:	:		
_										_		• • •	:	:	
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55 — ——————————————————————————————————										<del></del>		:	:		
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60 —										<del></del>		:	:		
-									F	_		:	· :	:	
	THI	E STR	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATI	E BOUNI	DARY LINES BET	WEEN:	SOIL TYP	ES. IN-S	SITU THE TRANSIT	TION MA	Y BE GRAD	DUAL.
₩L				ws 🗆	WD 🗆	BORING STARTE		11/14/12							
Ψ WL(B				WL(AC		BORING COMPLE		11/14/12			CAVE	IN DEPTH			
(□ - WL	,		-		-	RIG CME 55		FOREMAN Ar	mador			LING METHOD Ai	r Rota	rv	

CLIENT							JOB#		BORIN	IG#		SHEET		
City o	f Au:	stin						3795		B-23		1 OF 2		20
PROJECT	NAME f <b>Au</b> :	stin ·		ingd	lale/US Hwy	290 Water	ARCH	TECT-ENGINEER	?			•		71/2
												-O- CALIBRA	TED PENETRON TONS/FT2	METER
Spring	dale	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty	, TX.				1 2	_	4 5+
						STATION						ROCK QUALITY  RQD% —	DESIGNATION REC.%	
10093	828	.248		3143	3506.6512 DESCRIPTION OF N	ΛΑΤΕΡΙΔΙ		ENGLISH	LINITS		П	20% 40%		0% 100%
	_	ЭE	T. (IN)	<u> </u>	DECORAL FICH OF I	W CI EI CO AE		LNGLISH		ELS (FT)		PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT %
(FT)	NO.	E TYF	E DIST.	ERY	BOTTOM OF CASIN	G 🔳	LOSS	OF CIRCULATIO	N ∑100%	LEV	9/	-	•	
<b>DEPTH (FT)</b>	SAMPLE	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>507.3</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STAND	DARD PENETRAT BLOWS/FT	TION
0 _					CLAY, Sandy,	Silty, Light Brow	vn to E	Brown, Drv.		<u>&gt; ii</u>	7	10 20	30 4	0 50+
_	S-1	SS	18	18	Stiff to Very S	tiff, With Calcar	eous [	Deposits,		_	5 5	10-⊗	:	:
					(CH-CL)					- 			• • •	· · · · · · · · · · · · · · · · · · ·
_	S-2	ST	24	24						_			:	- <u></u> - 4.5
_										_			:	
5 —	S-3	ST	24	24						_				
									膷	_		<u> </u>	:	
_	S-4	ST	24	24						<del></del>		:\ :	• • •	-()- 4.5
_	۰ -	0.7	0.4	0.4						_		40.7		
10	S-5	ST	24	24	-Sandy Grave	Layers 10' to 1	5'			_		10.7-●	:	-⊖- 4.5
10					-Janay Grave	Layers to to 1	5			_			:	
_										<del>-</del>			:	
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_			10	10						_	6	45.0	: : :	· · · · · · · · · · · · · · · · · · ·
15 —	S-6	SS	18	18						_	6 9	15-⊗	:	
_										_				
_										- 490			:\	
_										<u> </u>				66
_	S-7	SS	18	18						_	12 28 38	18.7-●	<u>:</u>	<u>:</u> → ₩
20 —					SHALE, Gray				*N.N.Y.D	_	00		:	
_										_		: :	:	:
_										<del></del>			:	
_										_				
25 —	S-8	SS	11	11						_	26 50/5	: :	: : :	50/5−⊗
_										_			:	
_	S-9	RC	42	42						480			:	
_										- -			:	
_										_		: :	:	
30 —	S-10	SS	6	6	Limestone Lav	ers From 30' to	50'			_	50/6		:	50/6−⊗
	•	,				,					CC	NTINUED	ON NEX	T PAGE.
	TH	E STR	ATIFIC	ATION	I LINES REPRESENT	THE APPROXIMAT	E BOUN	IDARY LINES BET	TWEEN S	SOIL TYP		SITU THE TRANSITIO		
₩L				ws 🗌		BORING STARTE		11/14/12						
Ψ WL(B	CR)		<u></u>	WL(AC		BORING COMPLE		11/14/12			CAVE	E IN DEPTH		
₩ WL						RIG CME 55		FOREMAN A	mador		DRIL	LING METHOD Air F	Rotary	

CLIENT							JOB#		BORING	G #		SHE	ET			
City of	Aus	stin						3795		B-23		20	F 2			
PROJECT City of	NAME	etin .	-Sni	rinad	lale/US Hwy	200 Water	ARCHIT	ECT-ENGINEER							الل	
Improv SITE LOCA				iiigu	laic/OO i iwy	250 Water								3 .		Tu .
SITE LOCA	ATION												ALIBRATED	PENETRO DNS/FT2	METER	
Spring	ıdale	е Не	iaht	s an	d Walnut Pla	ce. Travis Co	ountv.	TX.				1	2	3 3	4	5+
NORTHIN	G		٦	EASTIN	IG	STATION						ROCK Q		SIGNATION	& RECC	
10093	828	.248	2	3143	3506.6512							RQD% 20%	6 <del></del>	REC.%		 100%
			<u> </u>		DESCRIPTION OF N	MATERIAL		ENGLISH (		<b>%</b> (		PLASTIC	· ·	VATER	•	LIQUID
_	<u>o</u>	YPE	JST.	NE)	BOTTOM OF CASIN	G <b>T</b>	1088	OF CIRCULATION	1 >100%>			LIMIT ⊢——	СО	NTENT %		LIMIT %
Ħ F	LE N	Ë	ᆵ	VER			2000	0. 0002		R LE ATIO	.9/S/	⊗	STANDARI	D PENETRA	TION	1
ОЕРТН (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATION	ON 507.3				WATER LEVELS ELEVATION (FT)	BLOWS/6"	_	BL	OWS/FT		50.
	0)	0)	0)	-	Limestone Lay	ers From 30' to	50'	E		<u>-                                    </u>		10	20	30	40 :	50+
										- <del></del> 475		•	:	•	:	:
	S-11	RC	60	56						- 4/3		:		:	:	
												:	:	:	:	:
35 —										-		:	:	:	<u> </u>	¬
										-		:	:	:	:	
										-		:	:	:	:	
	S-12	RC	60	58.5						<del></del>		:	:	:	:	
_										_		:	:	:	:	
40 —										-		•	į	:	_	_
										_		:	:	:		
_										-		:	•	:	1	
_	S-13	RC	60	60						<del></del> 465		:	:	:	: '	
_										_		:	:	:	<u> </u>	
45										_		:	:	:	1	
45 —										_		:	:	:	: -	T I
7								<u> </u>		_		:	:	:	:	
$\exists$	S-14	RC	60	58.5						460		:		:	:	i
_										_		:	:	:	:	
_										_		:	:	:	:	
50 —					END OF BOR	ING @ 50.00'				_		:	:	:	:	'
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_										<del>-</del> 455		:	:	:	:	:
										_		:	:	:	:	:
55 —										_		•	į	:	:	:
55 —									F	_		:		:	:	:
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										<del>-</del> 450		:	:		:	:
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60 —									þ	- -		:	:	:	:	:
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		- 070	\ T.C	\A.T.O.	LINEO DEDDESS:	THE ADDOCUMENT	E DOI:::	NDV   INICO 25-	WEEN: C	OII TY / 5	-0 "' -	UTILI TUE TO :	NOTION	AV DE CO	DUAL	
V	IHI	= 51K/			LINES REPRESENT				VEEN S	OIL TYPE	=5. IN-S	IIU IHE IKA	M MUITIGE	AT BE GKA	DUAL.	
₩. Wr				ws 🗌	WD 🗌	BORING STARTE		11/14/12								
∰ WL(B	CR)		<u>=</u>	WL(AC	CR)	BORING COMPLE	ETED	11/14/12			CAVE	IN DEPTH				
₩ wL						RIG CME 55		FOREMAN An	nador		DRILL	ING METHOD	Air Rota	arv		

TONS/FT <sup>2</sup>	S N
PROJECT NAME City of Austin -Springdale/US Hwy 290 Water Improvements SITE LOCATION  Springdale Heights and Walnut Place, Travis County, TX.  1 2 3 4	
Improvements SITE LOCATION  Springdale Heights and Walnut Place, Travis County, TX.  1 2 3 4	TN TN
Springdale Heights and Walnut Place, Travis County, TX.  1 2 3 4	
Springdale Heights and Walnut Place, Travis County, TX.	ΣK
NORTHING EASTING STATION REPRESENTATION REPRESENTAT	5+
ROOK QOALITI DEGIGNATION & RE	ECOVERY
10093747.8880 3142616.0468 RQD% — REC.% — 20% 40% 60% 80%	100%
DESCRIPTION OF MATERIAL ENGLISH UNITS  (V)  V  WATER  LOSS OF CIRCULATION  SURFACE ELEVATION  SURFACE ELEVATION  SURFACE ELEVATION  SURFACE ELEVATION  SURFACE SURFACE  SURFACE SURFACE  SURFACE SURFACE  SURFACE SURFACE  SURFACE SURFACE  S	LIQUID LIMIT %
F. OZ A BOTTOM OF CASING LOSS OF CIRCULATION SEED A S. S. BOTTOM OF CASING LOSS OF CIRCULATION SEED A S. S. BOTTOM OF CASING LIMIT CONTENT %	
USURFACE ELEVATION 529.4    Content %   Co	1
1,0 2,0 0,0	50+
S-1 SS 18 18 Stiff to Hard With Calcarous Deposits (CH.	:
CL)	÷
S-2 ST 24 24	0- :
	<b>○</b> - 4.5
5 — S-3 ST 24 24	0- :
	<b>(</b> )− : 4.5 :
S-4 ST 24 24	O- :
	4.5
S-5 ST 24 24 18.6 € 18.6 €	o <u></u> i
10 - 320	4.5
	: :
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S-6 SS 18 18 40-8	:
15 - 23   23   : : : : : : : : : : : : : : : : : :	:
SHALE, Gray	\
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	\
S-7 SS 18 18 18 18 18 18 18 18 18 18 18 18 18	51-8
20	
S-8 SS 18 18 18 18 18 18 18 18 18 18 18 18 18	<del></del> € 66
S-9   SS   18   18   Alternating Layers of Clay and Shale From 30'\	59-⊗
to 50'	:
CONTINUED ON NEXT	PAGE.
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUA	
THE THOUSAND BE GRADON	
¥ WL 28.00' WS □ WD □ BORING STARTED 11/17/12	
♀ WL 28.00'         WS □         WD □         BORING STARTED         11/17/12           ♀ WL(BCR)         ▶ WL(ACR)         BORING COMPLETED         11/17/12         CAVE IN DEPTH	

CLIENT							JOB#		BORIN	NG #		SHEE	T		
City of	Aus	stin						3795		B-2	4	2 OF	2	5	200
PROJECT City of	NAME Au:	stin ·	-Spi	inad	ale/US Hwy 2	290 Water	ARCHI <sup>*</sup>	TECT-ENGINEER	2						
Improv SITE LOCA				90										<u>.</u>	TM
SITE LOCA	ATION												LIBRATED TO	PENETROM DNS/FT <sup>2</sup>	ETER
Spring	dale	e He	ight	s an	d Walnut Plac	ce, Travis Co	ounty,	, TX.				1	2	3 4	5+
NORTHING	G			EASTIN	IG	STATION						ROCK QU. RQD%	ALITY DES	SIGNATION & REC.%	RECOVERY
10093	747	.888	_	3142	2616.0468							20%	40%	60% 80°	% 100%
		ш	Ž.	î	DESCRIPTION OF M	ATERIAL		ENGLISH	UNITS	SJ E		PLASTIC LIMIT		VATER NTENT %	LIQUID LIMIT %
Ĺ.	Ŏ.	TYP	DIST.	RY (I	BOTTOM OF CASING	<b>3</b>	LOSS	OF CIRCULATIO	N >100%	LEVE ON (F				• · · · · · · · · · · · · · · · · · · ·	
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATION	DN 529.4				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ s		D PENETRATI OWS/FT	ION
DEF	SAN	SAN	SAN	REC					177774	WA.	BLC	1.0	20	30 40	50+
					Alternating Lay to 50'	ers of Clay and	d Shale	From 30'		_		:	:		:
_	S-10	RC	60	40						_		:	:		
_										_		:	:	:   :	:
75										<del></del>		:	: 1		:
35 —												:	: -	7: -	
_										_		:			
_	S-11	RC	60	60						_		:	:		
_										_		:			
40 —										— 490 —		:	:		
_										_		:	:		
_										_		:	•	: :	
	S-12	RC	60	55						_		:	:	: :	
_										_		:			
45 <del></del>										<del></del>		:	:		
										_					
_												:		: :	
	S-13	RC	60	60						_		:	:		
										 480		:	:		<u> </u>
50 —					END OF BORI	NG @ 50 00'				— 460 —		:	:		!
_					LIND OF BOIL	110 @ 30.00				_		:	:		•
-										_		:	:		•
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55 —															:
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_										470		:	:	: :	:
60 —										^		:	:		:
$\vdash$										_		!	:	: :	:
	THI	E STR	ATIFIC	ATION	LINES REPRESENT	THE APPROXIMAT	E BOUN	DARY LINES BET	ΓWEEN :	SOIL TY	PES. IN-	SITU THE TRAN	ISITION M	AY BE GRAD	UAL.
¥ w∟ :				ws 🗌	WD 🗌	BORING STARTE		11/17/12							
₩ WL(B	CR)		Ť	WL(AC	R)	BORING COMPLE	ETED	11/17/12			CAV	E IN DEPTH			
₩ WL						RIG CME 55		FOREMAN A	mador		DRIL	LING METHOD	Air Rota	arv	

CLIENT							JOB#		BORIN	NG #			SHEET	П			
City of	f Au:	stin						3795		B-2	5	1	1 OF 2	2	5	<u>n</u>	
PROJECT	f Au:	stin ·		ringd	lale/US Hwy	290 Water	ARCHI	TECT-ENGINE	ĒR			•			3		) 1 <sub>m</sub>
SITE LOC	ATION											<b>-</b> ○-	CALIB		PENETRON NS/FT <sup>2</sup>	/IETER	
Spring	gdale	e He	ight	s an	<u>d Walnut Pla</u>	ce, Travis Co	ounty	, TX.				1		2	-	4 5	
			- 1			OTATION							CK QUALI <sup>*</sup> RQD% —	TY DES	IGNATION REC.%		:RY
10093	371 <u>9</u>	.815	3 <u>[</u>	3142	2295.0672 DESCRIPTION OF N	MATERIAL		ENGLIS	H UNITS			20				2% 100	
	Ö	'PE	ST. (II	<u>S</u>						/ELS		PLAS LIMIT			ATER ITENT %		QUID MIT %
н (FT)	ž H	ᄪ	ILE DI	VERY	BOTTOM OF CASIN	ig <u> </u>	LOSS	OF CIRCULAT	ION ZWZZ	R LE	.9/S	F	> STA	NDARD	PENETRA	TION	7
<b>DEРТН (FT)</b>	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on 526.8				WATER LEVELS ELEVATION (FT)	BLOWS/6"	11	_	BLC	DWS/FT	10 50	١.
0 _					CLAY, Sandy,	Silty, Light Brov	vn to 1	Fannish					<u> </u>			0 30	_
$\equiv$	S-1	ST	24	24	Calcareous D	Very Stiff to Hard eposits, (CH-CL	a, vvitn )	1		_ <del></del> 525							
_	S-2	ST	24	24						_		: :	:		•		
_										_					•		
5 —	S-3	ST	24	24								:					
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_	S-4	ST	24	24						<del></del>		:	:		•	: :	
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10	S-5	ST	24	24						_		:			•	: :	
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										_		:			•		
_	S-6	ss	18	18						_	13 24		18.9	i		<b></b> Ø	∑ <del>-</del> 58
15 —					SHALE, Gray					_	34	:		'	•	:	, 55
_					, , , , ,												
_										— 510 –		:			•	:	
_										_		:			•		
20	S-7	SS	11	11						_	24 50/5	:			•	50/5−⊗	<b>)</b>
20 —										_		:			•		
										505		:			•	:	
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_	S-8	SS	12	12							34	:	:		•	50/6-⊗	λ
25 —			12	12						_	50/6	:			•	30/0 €	,
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_										500 					•		
										_		:					
30 —	S-9	SS	10	10						_	34 50/4	14.	0-	<u> </u>			∑−50/4
-	ļ									_	1	:			•	: I :	
											CC	NTIN	NUEC	1O C	NEX	T PA	GE.
	TH	E STR	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMAT	E BOUN	DARY LINES B	ETWEEN:	SOIL TY	PES. IN-	SITU THE	TRANSIT	ION MA	Y BE GRAI	DUAL.	
Ţ WL				ws□	WD 🗌	BORING STARTE	D	11/16/12									
Ψ WL(B	CR)		Â	WL(AC	CR)	BORING COMPLE	TED	11/16/12			CAVE	IN DEPT	Н				
₩ WL						RIG CME 55		FOREMAN	Amador		DRIL	LING MET	HOD Air	Rota	ry		

CLIENT							JOB#		BORIN	IG#		SHEET		
City of	Aus	stin						3795		B-25		2 OF 2		
DDO IECT	NIAME		.Sn	rinad	lale/US Hwy	290 Water	ARCHIT	ECT-ENGINEER				<u> </u>		
Improv SITE LOCA				iiigu	iaic/OOTTWy	200 Water								T <sub>N</sub>
SITE LOCA	ATION											-O- CALIBRA	TED PENETROMETE TONS/FT2	:R
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 2	3 4	5+
NORTHIN	3			EASTIN	IG	STATION							DESIGNATION & RE	COVERY
10093	719	.815	3	3142	2295.0672							RQD% — 20% 40%	REC.%	100%
			<u> </u>	9	DESCRIPTION OF N	MATERIAL		ENGLISH U	JNITS	S, F		PLASTIC	WATER	LIQUID
F	Ŏ.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	BOTTOM OF CASIN	G 👚	LOSS	OF CIRCULATION	1 >100%>	WATER LEVELS ELEVATION (FT)		LIMIT 	CONTENT %	LIMIT %
<b>DEРТН (FT)</b>	SAMPLE NO.	PLE	PLE	OVE	CLIDEACE ELEVATI	ON FOC 0				ER L	BLOWS/6"	⊗ STAND	ARD PENETRATION	
DEP	SAM	SAM	SAM	REC	SURFACE ELEVATI	on 526.8				WAT	BLO	10 20	BLOWS/FT 30 40	50+
					SHALE, Gray					_		: :	: :	:
$\exists$	S-10	RC	60	53						<del></del>		: :		:
	0 10		00							_				:
_										_				:
35 —										_				¬i
										_				i.
_	S-11	RC	60	59						<del></del>				:
_	J-11		00	33						_		: :		
_										_				
40 —					Limestone Fro	m 40' to 50'				_				lj l
_						10 10 00				_		: :		
-	0.40	DO	00	00						<del></del>			: :	
=	S-12	RC	60	60						_				
$\exists$										_				
45 —										_				_
$\exists$										_				:
=										480				:
-	S-13	RC	60	44						_				:
-										_				:
50 —					END OF BOR	ING @ 50 00'				_		: i		:
-					LIND OF BOX	IIVO @ 30.00			ŀ	_				:
_									E	<del></del>				:
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55 —									E	_				:
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									E	_		:		:
									E	470			: :	:
									F	_		: :	: :	÷
									F	_				:
60 —									F	_				:
$\exists$									F	_				:
	,	'			•			'	-					•
	THI	E STRA	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	E BOUND	ARY LINES BETV	WEEN S	OIL TYPE	S. IN-S	SITU THE TRANSITION	MAY BE GRADUAL	
₩L				ws□	WD 🗌	BORING STARTE	D	11/16/12						
₩ WL(Be	CR)		<u></u>	WL(AC	CR)	BORING COMPLE	ETED	11/16/12		T	CAVE	IN DEPTH		
₩ WL						RIG CME 55		FOREMAN Am	nador		DRILL	ING METHOD Air R	otary	

CLIENT							JOB#		BORIN	IG #		SHEET		
City o	f Au:	stin						3795		B-26		1 OF 2	<b>F</b> 00	
PROJECT	NAME f <b>Au</b> :	stin ·		ringd	lale/US Hwy	290 Water	ARCHI	ITECT-ENGINEEF	₹	-				n.
												-O- CALIBRATED	PENETROMETER DNS/FT <sup>2</sup>	
Spring	<u>dale</u>	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty	, TX.				1 2	3 4 5+	
						0.7						ROCK QUALITY DE RQD% — —	SIGNATION & RECOVER' REC.%	Y
10096	569	.491	<u>/</u>	3142	2828.2310 DESCRIPTION OF N	MATERIAL		ENGLISH	UNITS			20% 40%	60% 80% 100%	
_	o	/PE	DIST. (I	(N)		_			\	/ELS I (FT)			WATER LIQU NTENT % LIMIT	
H (FT	LE NO	ᄪ	LE DI	VERY	BOTTOM OF CASIN	G _	LOSS	OF CIRCULATION	N 7100%	R LE	9/S/		D PENETRATION	
<b>DEPTH (FT)</b>	SAMPLE	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>526.6</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"		OWS/FT 30 40 50+	
0 _	- "	0,			Asphalt Depth	[5"], Base Dept	h [7"]		Sett		21	10 20	30 40 50+	
_	S-1	SS	18	18	CLAY, Sandy,	Silty, Brown to	Light E	Brown to		525	8	12-🛇		
_					Fragments, (C	oist, Stiff to Hard CH-CL)	i, vvith	Limestone		<del>-</del>			4.0	
_	S-2	ST	18	18						_		21.5-●	-0-	
5 —	S-3	ST	24	24						_		•		
_										_		18.9	4.5	
_	S-4	ST	24	24						<del></del>		●-18.6	-0-	
_										_			4.5	
_	S-5	SS	18	18						_	5 6	1413.7		
10 —										_	8			
_										_ <del></del> 515		: \:		
_										_		\		
_										_	5			
45	S-6	SS	18	18						_	9 14	18.7		
15 —										_				
_										510			\	
_					-Brown Clay L	ayer From 18' to	20'			_		: :	\	
_	S-7	ST	18	18	•					_		21.1-●	$\overline{}$	
20 —										_			4.5	
										— - — 505				
_					SHALE, Gray					_ 		: :	\	
_													\.	
-	S-8	ST	18	18						_		14.4-● ├──		
25 —										<del>-</del>		<u> </u>	i i\ i	
_										500				
_										_				
_											38	: :	: : \:	
30 —	S-9	SS	10	10						_	50/4		50/4-⊗	
_	•	'							<u> </u>		CC	NTINUED O	N NEXT PAG	E.
	TH	E STR/	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMAT	E BOUN	IDARY LINES BE	TWEEN S	SOIL TYPI	ES. IN-	SITU THE TRANSITION M	AY BE GRADUAL.	
≟ Mr				ws□	WD 🗌	BORING STARTE	D	11/10/12						
₩ WL(B	CR)		<b>▼</b>	WL(AC	CR)	BORING COMPLE	ETED	11/10/12			CAVE	IN DEPTH		
₩ WL						RIG CME 55		FOREMAN B	radley		DRIL	ING METHOD Air Rota	ary	

CLIENT							JOB#		BORIN	IG#		SHEET			
City of	f Aus	stin						3795		B-26	;	2 OF 2		5	2
PRO IFCT	NAME		-Sn	ringo	lale/US Hwy	290 Water	ARCHI	TECT-ENGINEER				•			
Improv SITE LOCA	vem	ents	<u> </u>	90										<u> </u>	TM
SITE LOC	ATION											-O- CALIBF		PENETROM NS/FT2	ETER
Spring	dale	He	<u>igh</u>	ts an	<u>d Walnut Pla</u>	ce, Travis Co	ounty,	TX.				1 2		3 4	5+
NORTHIN	G			EASTIN	NG .	STATION						ROCK QUALIT	TY DES		
10096	569	491		3142	2828.2310							RQD% <del>-</del> 20% 40	%	REC.% 60% 80	
		111	SAMPLE DIST. (IN)	2	DESCRIPTION OF N	MATERIAL		ENGLISH (	JNITS	SJ E		PLASTIC LIMIT		/ATER NTENT %	LIQUID LIMIT %
(F	NO.	ΤΥΡΙ	DIST	RY (I	BOTTOM OF CASIN	IG 👚	LOSS	OF CIRCULATION	1 >100%	ON (F		LIWITI	CON	• • • • • • • • • • • • • • • • • • •	
ОЕРТН (FT)	SAMPLE	SAMPLE TYPE	/PLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>526.6</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STAM		PENETRAT OWS/FT	ION
DEF	SAN	SAN	SAN	RE		<u> </u>				WA.	BLC	10 20		30 40	0 50+
_					SHALE, Gray					_ <del></del> 495		: :			
										_					
_															
_	0.10	00								_	50/5			: :	50/5
35 —	S-10	55	5	5						_	50/5	: :		: :	50/5−⊗
_										_ <del></del> 490		: :		: :	
_										_ 					
_														: :	
_										_					
40 —	S-11	SS	5	5							50/5				50/5−⊗
												: :			
_										<del></del>					
_										_					
_										_		: :		: :	
45 —	S-12	SS	5	5						_	50/5	: :		: :	50/5−⊗
_															
_										<del></del>					
_										_					
_										_					
50 —	S-13	SS	5	5	END OF BOR	INC @ 50.00'				_	50/5	: :			50/5-⊗
					LIND OF BOIN	VO @ 30.00			- 1	_					:
_										<del></del>					•
										_					•
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55 —										_					•
_										_		: :			:
_										470		: :		: :	:
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										_					:
60 —									-	_					
									-	_					
•					:				•					•	<del>-</del> 
	THE	STR	ATIFI	CATION	LINES REPRESENT	THE APPROXIMATI	E BOUNI	DARY LINES BET	WEEN S	SOIL TYP	ES. IN-S	SITU THE TRANSITI	ION MA	AY BE GRAD	UAL.
≟ Mr			_	ws□	WD 🗌	BORING STARTE	D	11/10/12							
₩ WL(B	CR)		<u>_</u>	WL(AC	CR)	BORING COMPLE	ETED	11/10/12			CAVE	IN DEPTH			
₩ WL						RIG CME 55		FOREMAN Br	adley		DRILL	ING METHOD Air	Rota	ry	

CLIENT							JOB#		BORIN	G #		SHEET	
City of	f Au:	stin					379	95		B-27		1 OF 2	
PROJECT	NAME Au:	stin ·		ringd	lale/US Hwy	290 Water	ARCHITECT-	ENGINEER				•	
SITE LOC	ATION												ED PENETROMETER FONS/FT <sup>2</sup>
Spring	dale	e He	igh	s an	d Walnut Pla	ce, Travis Co	ounty, TX					1 2	3 4 5+
						STATION						ROCK QUALITY DI	ESIGNATION & RECOVERY  REC.%
10096	721	.065		3142	2976.0581 DESCRIPTION OF N	MATERIAL		ENGLISH U	INITS		<u> </u>	20% 40%	60% 80% 100%
	ċ	PE	DIST. (IN)	<u> </u>		_				ELS (FT)		PLASTIC LIMIT CO	WATER LIQUID ONTENT % LIMIT %
I (FT)	N H	ΕT	E DIS	/ERY	BOTTOM OF CASIN	IG 💮	LOSS OF C	IRCULATION	<u> \</u>	? LEV	.9/8	Q 2741/D45	
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>520.9</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	E	RD PENETRATION BLOWS/FT
0 _	S-1	SS	5	5	Asphalt Depth	[6"], Base Dept	h [18"]	Į	مديده	-	50/5	10 20	30 40 50+ 50/5=⊗
_	<u>, 5-1</u>	- 55		J J						<del>-</del> 520	00/0		30/07-05
_	S-2	SS	18	18		Silty, Yellowish				_	16 3	7	
					Dry to Moist, in Deposits, (CL)	Firm to Hard, Wi )	in Calcared	ous :		_	4	\. !	
5 <del></del>	S-3	ST	24	24						<del>-</del>		<u>\</u>	-0-
_										- <del></del> 515		<u> </u>	4.5
_	S-4	ST	24	24						_			-0-
_										_			4.5
_	S-5	ST	24	24						_			-0-
10 —										_			4.5
_										<del></del> 510			
_										_			\
_										-			\
_	S-6	ST	24	24						-			4.0
15 —										— — 505		: :	:\
										-			
_										- <del>Z</del>			
_	S-7	ST	24	24	-Sandy Grave	I Layer 18' to 20				<del>-</del>		<u> </u>	
20 —					SHALE, Gray			- 1		_			
_					STIALE, Glay					<del>-</del> 500		: :	: :\ :
										_			
_										_			
_	S-8	ss	18	18						_	33 39 49	: :	88-💸
25 —											43		
_										<del></del>			
$\equiv$										_		<u> </u>	
_										_			
30 —	_S-9	SS	5	5						_	50/5		50/5−⊗
-					l			E		-	ا ا		
											CC	NIINUED C	N NEXT PAGE.
			ATIFIC	CATION	LINES REPRESENT	THE APPROXIMAT	E BOUNDARY	LINES BETV	VEEN S	OIL TYPE	S. IN-	SITU THE TRANSITION I	MAY BE GRADUAL.
≟ Mr	18.00	)		ws□	WD 🗌	BORING STARTE	D 11/	13/12					
₩ WL(B	CR)		<u>=</u>	WL(AC	:R)	BORING COMPLE	TED 11/	13/12			CAVE	IN DEPTH	
≟ Mr						RIG CME 55	FO	reman Am	nador		DRIL	LING METHOD Solid S	Stem, Air Rotary

CLIENT							JOB#		BORIN	NG #		SHEET			
City of	Aus	stin						3795		B-27	7	2 OF 2	2	5	
City of PROJECT City of	NAME	stin -	-Sp	rinad	lale/US Hwy	290 Water	ARCHI	3795 TECT-ENGINEER							US I
Improv SITE LOCA	/em	ents	<u> </u>	90										3.	TM
												-O- CALIB		PENETRON NS/FT <sup>2</sup>	METER
Spring	dale	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	, TX.					2		4 5+
			- 1			STATION						ROCK QUAL RQD% -	ITY DES	IGNATION 8 REC.%	RECOVERY
10096	721	.065		3142	2976.0581 DESCRIPTION OF N	AATEDIAL		FNOUR					0%		100%
		ш	T. (IN)	<u> </u>	DESCRIPTION OF I	//ATERIAL		ENGLISH	UNITS	SI: E		PLASTIC LIMIT		/ATER NTENT %	LIQUID LIMIT %
(F	Š.	<u>F</u>	: DIS	ERY (	BOTTOM OF CASIN	G 🔻	LOSS	OF CIRCULATION	N >100%	LEVE	9			•	
ОЕРТН (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>520.9</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STA		PENETRAT	TION
吕	SA	SA	SA	RE	CHALE Crov			1		∯ ⊒ — 490	BL	10 2	20		0 50+
					SHALE, Gray							:	•	•	
												•	•	•	
										_		•	•	•	
35	S-10	SS	6	6							50/6		•		50/6−⊗
35										 <del></del> 485			:		
												:		:	
										_		:	:	:	
_										_		:	:	:	
40	S-11	SS	6	6						_	50/6	:	:	:	50/6−⊗
,										 480		:	•	:	
										_		:	•	Ė	
										_		:	•	į	
										_		:	•	:	
45	S-12	SS	6	6						_	50/6	:	•	:	50/6−⊗
										_ <del></del> 475		:	•	į	
_										_		:	:		
										_		:	:	:	
										_		:	:	:	
50	S-13	SS	4	4						_	50/4	:	:	:	50/4−⊗
					END OF BOR	ING @ 50.00'				470			:	:	
										_		:	:	•	
_										_		:	•	:	
										_		:	:	•	! ! !
55 —										_			:	:	
_									ŀ	465			:	:	
									ļ	_			•	•	
										_		:	•	:	
										_		:	•	:	
60 —										_		:	•	:	
										 460		:		:	
'	'	'	•		•			'	'	•		•	•	•	
			ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATI	E BOUN	DARY LINES BET	WEEN:	SOIL TYF	PES. IN-	SITU THE TRANSI	TION MA	AY BE GRAD	DUAL.
≟ Mr ,	18.00	1		ws□	WD 🗌	BORING STARTE	:D	11/13/12							
∰ Mr(Bo	CR)		<u></u>	WL(AC	ER)	BORING COMPLE	ETED	11/13/12			CAVE	IN DEPTH			
₩ WL						RIG CME 55		FOREMAN Ar	mador		DRIL	LING METHOD S	olid Ste	em. Air R	otarv

CLIENT							JOB#		BORIN	G #		SHEET			
City of	Aus	stin						3795		B-28		1 OF 2		n_	
City of	NAME	stin .	-Sn	ringo	lale/US Hwy	290 Water	ARCHI <sup>*</sup>	3795 TECT-ENGINEER							7
Improv	vem	ents	ОР	illigo	iaic/OO i iwy	200 Water									<i>)</i> ∎ <sub>™</sub>
SITE LOC	ATION												D PENETROM ONS/FT <sup>2</sup>	ETER	
Spring	dale	e He	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 2	3 4	5+	
NORTHIN	G			EASTIN	lG	STATION						ROCK QUALITY DE RQD% — —	SIGNATION & REC.%	RECOVE	RY
10094	646	.269		314	1953.8368 DESCRIPTION OF N	AATEDIAL						20% 40%	60% 80	% 100	%
		ш	T. (IN)	<u> </u>	DESCRIPTION OF I	//ATERIAL		ENGLISH		FJ (F			WATER ONTENT %		QUID //IT %
FT)	NO.	TYP	DIS	:RY (	BOTTOM OF CASIN	G 🔻	LOSS	OF CIRCULATIO	N >100%	LEVE ION (	9		•		1
<b>DEРТН (FT)</b>	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>532.3</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"		D PENETRAT LOWS/FT	ION	
0	SA	SA	SA	R	CLAV Condu	Silty, Light Brov	un to T	on Druto		<u>× ⊒</u>	B	10 20	30 40	50-	+
	S-1	ST	24	24	Moist, Firm to	Hard, With Calc	areous	Deposits		-		: :		<del>-</del> О- :	
					and Gravel La	yers, (CH-CL)				- 530		: :		4.5	
_	S-2	ST	24	24						-		•	-0-	:	
_										_	3	10.9	3.25	:	
5 —	S-3	SS	18	18						_	5 7	12-⊗ <b>●</b>		:	
_										- <del>-</del>	3	<u> </u>		:	
_	S-4	SS	18	18						- 525	6 5	11-⊗ 20.6-●	: :	:	
										_		/ :		:	
_	S-5	SS	18	18						- <del>-</del>	6 3	8-⊗ 19.7-●		:	
10 —										- —	5			:	
_										_				:	
_										<del>-</del> 520		: :\		:	
_										_		: : : `	\:	:	
	S-6	SS	18	18						_	7 14 20	23.1-		i	
15 —										_	20		34	:	
										_			;	:	
_										<del></del> 515					
_										_	5				
	S-7	SS	18	18						_	19 36	24.6-●		55-⊗	)
20 —					SHALE, Gray					_		: :			
-										_		: :			
_										<del>-</del> 510					
_										_			: :		
25 —	S-8	SS	10	10						_	36 50/4	14.3 ● ├			-50/4
										-					
_										<del>-</del>		: :	: :		
	S-9	RC	60	60						<del></del>		: :	: :		
										-					
30 —										-					
-											 	: :	: : :	  -	
											CC	NTINUED O	N NEX	i PAC	jΕ.
	THI	E STR	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	E BOUN	DARY LINES BET	WEEN S	OIL TYPE	S. IN-S	SITU THE TRANSITION N	IAY BE GRAD	UAL.	
$\stackrel{\underline{\overline{\Box}}}{\underline{\Box}} \ WL$				ws□	WD 🗌	BORING STARTE	D	11/10/12							
₩ WL(B	CR)		Ť	WL(AC	CR)	BORING COMPLE	TED	11/10/12			CAVE	IN DEPTH			
₩ WL						RIG CME 55		FOREMAN B	adlev		DRILI	LING METHOD Air Rota	arv		

CLIENT							JOB#		BORIN	IG #		SHE	ET			
City of	Aus	stin						3795		B-28		20	F 2		n <sub>a</sub>	
PROJECT	NAME	etin .	Sn	ringd	lale/US Hwy	200 Water	ARCHIT	3795 ECT-ENGINEER								
Improv SITE LOCA				iiigo	iaic/OO i iwy	250 Water										<b>_</b> <b>_</b> ™
SITE LOC	ATION											-Ó- C	ALIBRATED	PENETRON ONS/FT <sup>2</sup>	METER	
Spring	idale	Не	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1	2		4 5	+
NORTHIN	G			EASTIN	lG	STATION								SIGNATION		ERY
10094	646	.269	0	314 <sup>2</sup>	1953.8368							RQD% 20%	40%	REC.%		0%
			<u>N</u>	J)	DESCRIPTION OF N	MATERIAL		ENGLISH (	JNITS	S (		PLASTIC		VATER		IQUID
Ē	ō.	ΥPE	JIST.	(}	BOTTOM OF CASIN	G 🖿	LOSS	OF CIRCULATION	1 >100%	EVEL N (F		LIMIT 	СО	NTENT %	LI	MIT % ⊢
БЕРТН (FT)	PLE !	, E	드	RECOVERY (IN)						WATER LEVELS ELEVATION (FT)	,9/S/	⊗	STANDARI	D PENETRA	ΓΙΟΝ	'
DEP'	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	REC	SURFACE ELEVATI	on <b>532.3</b>				WAT	BLOWS/6"	10	BL 20	.OWS/FT 30 4	10 50	)+
_					SHALE, Gray							:		:	:	ĺ
	S-10	DC	60	60						500		:	:	i	:	
_	3-10	NC	00	00						_		:	:		:	
-										_		:	:	:	:	
35 —												:	:	:	:	
-												:	:	:	:	
=	0.44	DO	00	00						_ <del></del> 495		:	:	:	:	
-1	S-11	RC	60	60						_		:	:	:	:	
=										_		:	:	:	:	
40 —												:	:		:	
$\exists$										_		:	:	:	:	
_										_ <del></del> 490		•	:		:	
_	S-12	RC	60	60						- -		:		:	:	
										_		:	:	:	:	
45 —					-Limestone Fr	om 45' to 50'				_		:	:	i	:	
					-Limestone Fr	0111 45 10 50						•		:		
										_ <del></del> 485		•		:		
	S-13	RC	60	55						400 		•	:			
												•		:		
50 —					END OF BOD	INC @ 50 00!						•	:		<u> </u>	
					END OF BOR	ING @ 50.00			-			:	:	:	:	
_									F			:	:	:	:	
55 —									F	<del></del> 480 		:	:	:	:	
									F	_		:	:	:	:	
55 —									F	_		:	:	:	:	
									F	_		:	:	:	:	
									F			:	:	:	:	
									F	<del></del>			:			
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60 —									F	_		:	:	:	:	
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'		'			•			'	_			•	•	•	•	
	THI	STRA	ATIFIC	CATION	I LINES REPRESENT	THE APPROXIMATE	E BOUND	ARY LINES BET	WEEN S	SOIL TYPE	ES. IN-S	ITU THE TRA	NSITION M	AY BE GRAI	DUAL.	
≟ Mr				ws□	WD 🗌	BORING STARTE	D	11/10/12								
₩ WL(B	CR)		<u>=</u>	WL(AC	CR)	BORING COMPLE	ETED	11/10/12			CAVE	IN DEPTH				
₩ WL						RIG CME 55		FOREMAN Bra	adlev		DRILL	ING METHOD	Air Rota	arv		

CLIENT							JOB#	BORI	NG#			SHEET				
City o	f Au:	stin					3795		B-2	29		1 OF	2		<u> </u>	
PRO IFCT	NAME	:	Sn	ringo	lale/US Hwy	200 Water	ARCHITECT-ENGINE	R				<u>,</u>			U S	
				illigu	iale/OS i iwy	290 Water								4,		<b>)</b>
SITE LOC	ATION	00										-O- CALI		PENETRON	1ETER	
Spring	ndale	. He	iahi	s an	d Walnut Pla	ce Travis Co	ounty TX					1	2	ONS/FT2 3 4	1 5	+
NORTHIN	G		J	EASTIN	d Walnut Pla	STATION	,, ,					ROCK QUA	-	SIGNATION 8		
10094	1498	213	2	314	1851.2279							RQD% 20%	— — 10%	REC.% 60% 80	10	0%
					DESCRIPTION OF N	MATERIAL	ENGLIS	H UNITS		T		PLASTIC	-	VATER		QUID
	o	/PE	ST. (	(IN)	BOTTOM OF CASIN		LOSS OF CIRCULAT	ON [MV]	VELS	_		LIMIT		NTENT %		MIT %
<b>DEPTH (FT)</b>	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	BOTTOM OF CASIN		LOSS OF CIRCULAT	ON ZWAZ	WATER LEVELS	ELEVATION (FT)	9/9	Λ 91	VNIDVDI	D PENETRAT	ION	
EPT	AMP	AMP	AMP	ECO	SURFACE ELEVATI	on <b>529.6</b>			/ATE		BLOWS/6	O	BL	OWS/FT	ION	
0 _	S	S	S	<u>«</u>	Asphalt Depth	[4"], Base Dept	h [12"]		<u></u> ≶ 1	<u>"   '</u>	<u>n</u>	10	20	30 4	0 50	)+
	S-1	ST	12	12				næwææ	F				:	:	-0-	
					Dark Grav. Dr	Silty, Brown to v to Moist, Hard.	Dark Brown to With Calcareous						:	:	4.5	
_	S-2	ST	24	24	Deposits, (CH	-CL)			F			:	:	:	 4.5	
									F				•		4.5	
5 —	S-3	ST	24	24					— 52 —	5				:	- <b>O</b> - 4.5	
_	-								F			:	:	:	4.5	
	S-4	ST	24	24								:	:	:	-0-	
_														:	4.5	
_	S-5	ST	24	24								:	:	:	-0-	
10 —									52	0		:	:	:	4.5	
_												:		:		
_												:	:	:		
_												:	•	•		
_	S-6	ST	24	24					⊢				:	:		
15 —									51	5			:	3.5		
_									<u> </u>			:	:	:		
_									<u> </u>			:	:	:		
_									<u> </u>			:	:	:		
_	S-7	ST	24	24					F			:	:		-0-	
20 —	, 	01							<u> </u>	0		:		:	4.5	
					SHALE, Gray				E			:	:	:		
									<u> </u>			:		:		
_	L		L						F			: :	:	:	•	
_	S-8	ST	24	24					<u> </u>			: :	:	:		
75	3-0	31	24	24					50	5		: : :	:	:	4.5	
25 —									<u> </u>			: :	:	:		
_	}								F			•	:	:	•	
_									F			:	:	:		
_			<u> </u>	2.					Ė.			:	:	:		
	S-9	ST	24	24					— — 50	0		:	:	:	4.5	
30 —												:	:	:	•	
										C	O	NTINUE	D OI	N NEX	ТРА	GE.
	71.1	E OTO	٨Τ١٢١	CATION:	I I INEO DEDDEOESE	THE ADDDOVINATION	E DOLINDARY LINES S	T\0/CC\$:	CO!! T							
∇	IH	LOIK	- IIFK				E BOUNDARY LINES B	- I VVEEN	JUIL I	1 - 20.	11 <b>V</b> -O	IIU IHE IKANS	ITION IVI	AT DE GRAL	JUAL.	
₩ WD BORING STARTE						D 11/13/12			$\bot$							
₩ WL(BCR) ₩ WL(ACR) BORING COMPL						G COMPLETED 11/13/12 CAVE IN DEPTH										
₩ WL	·						FOREMAN	Amado	r	D	RILL	ING METHOD S	olid St	em, Air Ro	otary	

CLIENT							JOB#	ВО	RING#			SHEET			
City of	Aus	stin					3795		В	-29		2 OF 2	2	5	200
DDO IECT	NIVME	:	Sn	rinad	lale/US Hwy	200 Water	3795 ARCHITECT-ENGINE	ER							58
Improv SITE LOCA				iligu	laic/OO i iwy	250 Water								5_	TM
SITE LOC	ATION											-O- CALIB		PENETROM DNS/FT <sup>2</sup>	ETER
Spring	ıdale	e He	iaht	s an	d Walnut Pla	ce. Travis Co	untv. TX.					1 :	2	3 4	5,+
NORTHIN	G		Ĭ	EASTIN	lG	STATION	,					ROCK QUALI	-		•
10094	498	.213	2	3141	1851.2279							RQD% <del>-</del> 20% 40	<del>-</del>	REC.% 60% 809	<del></del> % 100%
10001					DESCRIPTION OF N	MATERIAL	ENGLI	SH UNIT			П	PLASTIC		VATER	LIQUID
	Ċ.	/PE	SAMPLE DIST. (IN)	RECOVERY (IN)				\_	WATER LEVELS	ELEVATION (FT)		LIMIT		NTENT %	LIMIT %
4 (FT	ž y	L H		VER	BOTTOM OF CASIN		LOSS OF CIRCULA	IION Z		Į Į	.9/S	0 074	NDADE	D PENETRATI	ON
<b>DEPTH (FT)</b>	SAMPLE NO.	SAMPLE TYPE	AMP	ECO	SURFACE ELEVATI	on <b>529.6</b>			/ATE	LEV/	BLOWS/6"	⊗ STA		OWS/FT	ON
	S)	S)	σ,	~	SHALE, Gray				<i>&gt;</i>	Ш	<u>m</u>	10 2	0	30 40	50+
_					01 11 (LL)				_			:			•
_												:	:		:
_	0.40	O.T.	0.4									:			
	S-10	51	24	24						195		:		: :	-\
35 —												:			:
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_									丰			:			•
_									土			:			:
_	S-11	ST	24	24						190		•			- <del>-</del>
40 —									<b>}</b> -	+90		:			4.5
_									F			:			•
_												:	•	: :	:
												:	:		:
	S-12	ST	24	24					#					: :	- <b>&gt;</b> -
45 —										185		:			4.5
_												:	:	: :	:
_												:		: :	•
_												:	:		:
_	S-13	ST	24	24					_			:	•	: :	
50 —	0	01	27	24						180		:		: :	4.5
- 50					END OF BOR	ING @ 50.00'			F			:	:	: :	:
_									F			:		: :	:
									F						•
_									L			:		: :	:
_										175		:	:	: :	:
55 —									E.			:			:
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_												:		: :	:
55 —									F			:	:	: :	:
									F			:		: :	:
60 —									F-4	170		: : :		: :	•
-												:		: :	:
•	,			•							•			·	·
	THI	E STR/	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATI	BOUNDARY LINES	BETWEE	N SOIL	TYPE	ES. IN-S	SITU THE TRANSIT	ION M	AY BE GRADI	JAL.
≟ Mr	_		_	ws□	WD 🗌	BORING STARTE	11/13/12			_	_		_		
$\underline{\underline{\Psi}}$ WL(BCR) $\underline{\underline{\Psi}}$ WL(ACR) BORING COMPLE							TED 11/13/12				CAVE	IN DEPTH			
₩ WL						RIG CME 55	FOREMAN	Amad	lor	T	DRILL	ING METHOD So	olid St	em, Air Ro	tary

CLIENT							JOB#		BORIN	G #		SHEET		
City of	Aus	stin						3795		B-30		1 OF 2		
City of PROJECT	NAME	stin .	-Sn	rinad	ale/US Hwy	290 Water	ARCHI	TECT-ENGINEER	₹	<u> </u>		1 . 0. 2		
Improv				illigu	laic/OO I IWy	200 Water								TN
SITE LOCA	ATION											-O- CALIBRAT	ED PENETROM TONS/FT <sup>2</sup>	ETER
Spring	dale	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty	, TX.				1 2	3 4	5+
NORTHIN	3			EASTIN	IG	STATION						ROCK QUALITY D		RECOVERY
10095	852	.224		3141	1412.1835							RQD% — - 20% 40%	REC.%	% 100%
		ш	N	î	DESCRIPTION OF N	//ATERIAL		ENGLISH		LS (F		PLASTIC LIMIT (	WATER ONTENT %	LIQUID LIMIT %
FT)	ġ.	Ϋ́	DIST.	RY (I	BOTTOM OF CASIN	G 🖢	LOSS	OF CIRCULATIO	ON ∑100%	LEVE ION (	 		• · · · · · · · · · · · · · · · · · · ·	
БЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE	RECOVERY (IN)	SURFACE ELEVATI	on <b>547.5</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"		RD PENETRAT BLOWS/FT	ION
O	SA	SA	SA	R						WA ELE	BL(	10 20	30 4	50+
	S-1	ST	24	24		[4"], Base Dept			0 P 1 T D 1 T	_			: :	:
					CLAY, Sandy, Moist, Very St	Silty, Yellowish iff to Hard, (CH)	Brown	n, Dry to		-		: :	: :	:
	S-2	ST	24	24		, ( ,				<del></del> 545		: :		-O-
										-				4.5
5—	S-3	ST	24	24						-		: :		- <b>\rightarrow</b> - 4.5
										-		: :		4.5
_	S-4 ST 24 24									-				- <u></u>
-	5-4 51 24 24									<del></del>				4.5
_	S-5	SS	18	18						-	6 8	18 11.2 <del>-</del> ● ⊗		:
10 —										-	10	\ 		:
										_				:
										 535				:
										535 			\	:
_	S-6	ss	18	18							8 11	11.6-● 27		
15 —										-	16		\.	
										-				
_										- 530			:\:	:
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_	S-7	SS	18	18						- <del>-</del>	16 19	11.5-●	40->	
20 —										_	21			
_										_				:
										- <del></del> 525		: :	<u>;/</u>	:
										-	_	25.0	/: :	:
_	S-8	ss	18	18						- <del>-</del>	7 11 13	1	<del>(                                    </del>	
25 —										- <del>-</del>	13	24	\.	:
_										- -		: :		:
_					SHALE, Gray				M.M.K.M.	- <del></del> 520				. :
_										_	22			
	S-9	SS	18	18						_	28 38	: :		66–⊗
30										_	55		: :	
											CC	ONTINUED (	N NEX	ΓPAGE.
	71.11	- CTD	٨Τ١٢١	ATION!	LINES DEDDESCRIT	THE ADDDOVINATO	E DOUB	IDADV LINIES SE	TWEEN			SITU THE TRANSITION		
₩L	IHI	_ SIK/	TIPIC	ws 🗆	WD	BORING STARTE			I WEEN S	OIL I TPE	.o. IIV-	OILO THE TRANSITION	IVIAT DE GRAD	UAL.
						ט	11/12/12							
₩ WL(BCR) ¥ WL(ACR) BORING COMPL						ETED	11/12/12			CAVE	E IN DEPTH			
₩ wL								FOREMAN A	mador		DRILI	LING METHOD Air Ro	otarv	

CLIENT							JOB#		BORIN	NG #		SHEET			
City of	f Aus	stin						3795		B-30		2 OF 2		5	n a
PROJECT	NAME f <b>A</b> 119	stin -	-Sn	ringo	lale/US Hwy	290 Water	ARCHI <sup>-</sup>	3795 TECT-ENGINEER	ļ			1 20. 2			
Improv				illige	iaic/CC i iwy	200 Water								3 <sub>22</sub>	TM
SITE LOC	ATION											-O- CALIBR	ATED PEN		TER
Spring	dale	e He	igh	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.				1 2		4	5+
NORTHIN	G			EASTIN	IG	STATION						ROCK QUALIT		ATION & REC.%	RECOVERY
10095	852	.224	_	314 <sup>-</sup>	1412.1835							20% 40°			6 100%
		ш	S.	2	DESCRIPTION OF N	MATERIAL		ENGLISH	UNITS	LS FT		PLASTIC LIMIT	WATE		LIQUID LIMIT %
FT)	Ŏ.	TYP	DIS	IRY (I	BOTTOM OF CASIN	G 👚	LOSS	OF CIRCULATION	N >100%	LEVE ION (	<u></u>	-	•	11 70	
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>547.5</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STAN	IDARD PEN BLOWS		NC
DE	SA	SA	SA	Ä	OLIM E O					WA	BL(	10 20		40	50+
					SHALE, Gray					_		: :	:	:	
										515		• •		:	
_										_	38		:	:	
35 —	S-10	SS	17	17						_	48 50/5	: :	•		98/11-🛇
										_		: :	:	:	
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_										<del></del> 510			:	:	
										_				:	
40 —	S-11	SS	11	11						_	36 50/5		:	:	50/5-🛇
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										_			:	:	
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_										_		: :	:	:	
45 —	S-12	SS	5	5						_	50/5		:	:	50/5-🛇
_										_		• •		:	
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_										<del></del>		: :	:	:	
	S-13	99	16	16						_	32 48		:		98/10−⊗
50 —	0 10		-10		END OF BOR	ING @ 50 00'				_	50/4		:	:	30/10 🚫
_					END OF BOIL	110 @ 00.00				_			:	:	:
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55 —												• •		:	: : :
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60 —										_			:	:	: :
-										_		: :	:	:	:
	THI	E STR	ATIFIC	CATION	LINES REPRESENT	THE APPROXIMATE	E BOUNI	DARY LINES BET	WEEN:	SOIL TYPI	ES. IN-S	SITU THE TRANSITI	ON MAY B	E GRADL	JAL.
₩L				ws 🗌	WD 🗌	BORING STARTE	D	11/12/12							
₩ WL(BCR) ₩ WL(ACR) BORING COMPLETED						TED	11/12/12		+	CAVE	IN DEPTH				
₩L(BCR) ₩L(ACR) BORING COMP								FOREMAN Ar	mador			LING METHOD Air	Rotary		

CLIENT							JOB#		BORING	6 #		SHEET		
City o	f Au:	stin					37	95		B-31		1 OF 2		20
PROJECT	NAME f Au	stin -		ringd	lale/US Hwy	290 Water	ARCHITECT					•		The state of the s
SITE LOC	ATION											-O- CALIBRA	ATED PENETRON TONS/FT2	METER
Spring	<u>dale</u>	He	ight	s an	d Walnut Pla	ce, Travis Co	ounty, TX	ζ				1 2	-	4 5+
						0.7						RQD% —	DESIGNATION &	
10095	690	.288	<u>9</u> ፪	314	1322.1759 DESCRIPTION OF N	MATERIAL		ENGLISH U	JNITS		$\Box$	20% 40%		0% 100%
_	o.	'PE	ST. (I	(S)		_			, \square = \frac{1}{2}	(FT)		PLASTIC LIMIT	WATER CONTENT %	LIQUID LIMIT %
H (FT	LE NO	<u> </u>	LE D	VER	BOTTOM OF CASIN	G	LOSS OF C	IRCULATION	1 / 1004/ 1	ATION	.9/S/	STANE	DARD PENETRAT	TION
<b>DEPTH (FT)</b>	SAMPLE	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>543.9</b>			<u>\</u>	WATER LEVELS ELEVATION (FT)	BLOWS/6"	10 20	BLOWS/FT	10 50+
0 _					CLAY, Sandy,	Silty, Light Brow	vn to Yello	wish				10 20	<u> </u>	
	S-1	ST	24	24	Calcareous D	oist, Stiff to Very eposits, (CH-CL)	Stiff, vvitn )			_				
_	S-2	ss	18	18						_	5 5	11 ⊗	:	
_										<del>-</del> 540	6		: :	
5 —	S-3	ss	18	18						_	2 3 7	10-⊗	:	
_										_	8		:	
_	S-4	SS	18	18						_	7	19-🛇	•	
_										-		<u> </u>	:	
_	S-5	ss	18	18						<del>-</del> 535	10 10	23-(		
10 —										_	13		/ :	
_										-		: /	:	: :
_										_			:	
_										- 520	4		:	
45	S-6	SS	18	18						<del>-</del> 530	7	17-⊗	•	
15 —										_			:	
_										_			:	
_					Sandy Crayo	I I avora 10' ta 2	0'			_			:	:
_	S-7	ss	18	18	-Sandy Grave	I Layers 18' to 2	U			<u>-</u> 525	10 8	17-⊗	:	
20 —	, ,				SHALE, Gray					_	9	" ~		
_					Or in tale, Gray					_		: :	1	
_										_				
										_	7	: :	:	52
	S-8	SS	18	18						<b>-</b> 520	7 20 32		:	$\otimes$
25 —										_			:	
										_		: :	•	:
_										_		: :	:	
_										<del>-</del> 515			:	
30 —	S-9	SS	5	5						_	50/5	: :	:	50/5−⊗
_	l	ı			I			E	<del></del>		ا ا م		ON N=1:	:
											CC	NTINUED	ON NEX	I PAGE.
			ATIFIC	CATION	LINES REPRESENT	THE APPROXIMAT	E BOUNDARY	/ LINES BETV	VEEN SC	OIL TYPE	S. IN-S	SITU THE TRANSITIO	N MAY BE GRAD	DUAL.
Ā Mr	18.50	)		ws□	WD 🗌	BORING STARTE	D 11/	13/12						
$\frac{\Psi}{\bar{z}}$ WL(BCR) $\frac{\Psi}{\bar{z}}$ WL(ACR) BORING COMPL						TED 11/	13/12			CAVE	IN DEPTH			
₩ WL	·							DREMAN Am	nador		DRILL	ING METHOD Solid	d Stem, Air R	otary

CLIENT							JOB#		BORIN	IG#		SHEET			
City of A	Aus	tin						3795		B-31		2 OF 2	2	5	
City of A	AME Aus	tin -	Sn	rinad	lale/US Hwy	290 Water	ARCHI	3795 TECT-ENGINEER							US I
Improve SITE LOCAT	eme	ents	<b>υ</b> ρ.	go										5_	TV
												-O- CALIB		PENETRON NS/FT <sup>2</sup>	METER
Springd	lale	Hei	ight	s an	d Walnut Pla	ce, Travis Co	ounty,	TX.					2	3 4	
NORTHING						STATION						ROCK QUALI	TY DES	IGNATION 8 REC.%	RECOVERY
100956	90.	288	_	314	1322.1759 DESCRIPTION OF N	AATEDIAL		ENOUGH.			_		0%		% 100%
		ш	I.	<u> </u>	DESCRIPTION OF I	//ATERIAL		ENGLISH	UNITS	ELS (F		PLASTIC LIMIT		ATER	LIQUID LIMIT %
E E	<u>8</u>	7	DIS	ERY (	BOTTOM OF CASIN	G 🔻	LOSS	OF CIRCULATION	V >100%	LEVE	9			•	
ОЕРТН (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST.	RECOVERY (IN)	SURFACE ELEVATI	on <b>543.9</b>				WATER LEVELS ELEVATION (FT)	BLOWS/6"	⊗ STA		PENETRAT	TON
법 ;	SA N	SA	SA	RE	CHALE Crov			1		W/	BL	10 2	20		0 50+
					SHALE, Gray							: :		:	
$\exists$												:	:	:	
$\exists$										_ <del></del> 510		• • •	:	:	
35 S-	-10	SS	6	6							50/6	: :	:	:	50/6−⊗
33												:	:	:	
										_		:	:	:	
										_		• • •	:	:	
										505		• • •	:	•	
40 S	-11	SS	6	6						_	50/6	:	:	:	50/6−⊗
										_		: :	:	:	
										_		:	:	•	
												:	:	:	
										500		: :	:	:	
45 S-	-12	SS	6	6						<del>-</del>	50/6	:	:	:	50/6−⊗
										_		:	:	:	
4										_		•	:	:	
4										_		: :		:	
										<del></del>		• • •	:	:	
50 — S	-13	SS	4	4	END OF BOR	INIC @ EO OO'				_	50/4	• • •	:	:	50/4−⊗
4					END OF BOK	ING @ 50.00			F	_		:	:	:	
4									F	_		: :	:	:	
									ŀ	_		:	:	:	
55 —									ŀ	490		:	:	:	
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$\exists$									ł	_		•	:	:	
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$\exists$									}	_		:	:	:	
-									}	485		:	:	:	
60										_		:	:	•	
$\dashv$									ł	_		:	:	:	
	THE	STRA	TIFIC	CATION	LINES REPRESENT	THE APPROXIMATI	E BOLINI	DARY LINES BET	WEEN	SOII TYPI	S IN-9	SITU THE TRANSIT	TION M	Y BE GRAF	DUAL
<u></u> ₩L 18				ws 🗆	WD 🗆	BORING STARTE		11/13/12	,	<u> </u>					- <del></del>
										001/5	IN DEDT!!				
Ψ         WL(BCR)         Ψ         WL(ACR)         BORING COMP           Ψ         WL         RIG CME 55							LIED	11/13/12 FOREMAN Ar	mador	$\dashv$		IN DEPTH  LING METHOD So	alid S+	am Air D	otary

## REFERENCE NOTES FOR BORING LOGS

# I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	<b>Dutch Cone Penetrometer</b>	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

## II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

## A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Dens	sity	Relative	Properties
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

		autiala Cira Idantification
	P	article Size Identification
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	1/4 to 1/2 inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

## B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	Consistency	Unconfined Comp. Strength Q <sub>p</sub> (tsf)	Degree of Plasticity	Plasticity Index
Under 2	Very Soft	Under 0.25	None to slight	0 - 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 - 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.99		
31 to 50	Hard	4.00-8.00		
Over 51	Very Hard	Over 8.00		

## III. Water Level Measurement Symbols

WL Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD While Drilling	$\nabla$	Est. Groundwater Level	▼ Est. Se	easonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

# **UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)**

N	Major Divis	ions	Grou		Typical Names				Lab	oratory C	lassifica	tion Cri	teria		
			Symb		Well-graded gravels, gravel- sand mixtures, little or no fines	soils			$C_u = D_0$	<sub>60</sub> /D <sub>10</sub> grea <sub>30</sub> ) <sup>2</sup> /(D <sub>10</sub> xl	ater thar	า 4			
	se fraction is eve size)	Clean gravels (Little or no fines)	GP	)	Poorly graded gravels, gravel-sand mixtures, little or no fines	se-grained			Not me	eeting all g	gradatio	n requir	ements for GW		
rained soils larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Gravels with fines (Appreciable amount of fines)	GMª	d	Silty gravels, gravel-sand mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils		bols <sup>b</sup>		erg limits l		\" line	Above "A" li between 4 borderline ca: use of dual sy	and 7 ses requ	are
Coarse-grained soils laterial is larger than	N)	Gra (Appre	GC	;	Clayey gravels, gravel-sand- clay mixtures	rain-size c r than No.		Atterberg limits below "A" line or P.I. less than 7 $C_u = D_{60}/D_{10} \text{ greater than 6} \\ C_c = (D_{30})^2/(D_{10}xD_{60}) \text{ between 1 and 3}$ Not meeting all gradation requirements for SW							
Coarse-gr		restion is ve size) Clean sands (Little or no fines)	SW	/	Well-graded sands, gravelly sands, little or no fines	ivel from g tion smalle	SC	es requirin	$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10}xD_{60})$ between			n 6 ween 1	1 and 3		
Coarse-gr (More than half of material is	se fraction sieve size)	Clean (Little fin	SP	)	Poorly graded sands, gravelly sands, little or no fines	nd and gra fines (fract	, GP, SW, GC, SM, 8	erline case	Not me	eting all g	gradation	n requir	ements for SW		
(More tha	Sands ore than half of coal smaller than No. 4 s	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)  Sands with fines (Appreciable amount of fines)		d u	Silty sands, sand-silt mixtures	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200	are classified as follows: Less than 5 percent GW More than 12 percent GM,			Atterberg limits above "A" or P.I. less than 4			Limits plotting i zone with P.I. b		en 4 erline
	(Mc	San (Apprec	SC	;	Clayey sands, sand-clay mixtures	Determine Dependin	are classi Less than More thar	5 to 12 pe		erg limits a		A" line	dual symbols	ing use	) OI
	ays	than 50)	ML	-	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity					Plast	icity Ch	nart			
. 200 Sieve)		and limit less	CL	-	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		60 50						"A" line		
; nan No	;	) LIGH	OL	-	Organic silts and organic silty clays of low plasticity	×	40						СН		
Fine-grained soils aterial is smaller th	sk	ays than 50)	МН	I	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Plasticity Index	30	_		CL					
Fine-gı f material i	Silts and clays (Liquid limit greater than 50)		СН	I	Inorganic clays of high plasticity, fat clays	Plas	20					MH	H and OH		
e than hal	Fine-grained soils  (More than half material is smaller than No. 200  Highly Sitts and clays Silts ( Crganic (Liquid limit greater than 50) (Liquid lim soils	OH	ł	Organic clays of medium to high plasticity, organic silts		0		CL-ML	ML ar		) (0	70 20	00 100		
(Mor			Pt		Peat and other highly organic soils		(	) .	10 20		40 50 Liquid		70 80	90 100	J

<sup>&</sup>lt;sup>a</sup> Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

<sup>b</sup> Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

### **Laboratory Testing Summary** Page 1 of 5 Atterberg Limits<sup>3</sup> Moisture - Density (Corr.)5 Percent Sample Sample Depth MC1 Soil **Passing** CBR Maximum Optimum Other Type<sup>2</sup> Source Number (feet) (%) No. 200 Density Moisture Value<sup>6</sup> LL PLPΙ Sieve<sup>4</sup> (%) (pcf) B-1 B-2 **S-4** 6.00 - 7.5013.2 CL 46 17 29 67.4 **B-3 B-4** 12.2 CL 33 17 S-4 6.00 - 7.50 16 83.7 S-5 8.50 - 10.00 14.1 **B-5** S-3 4.00 - 6.00 14.5 CL 44 18 26 84.9 B-6 S-2 2.00 - 4.00 14.6 43 85.5 S-3 4.00 - 5.50 12.7 CL 16 27 **S-4** 6.00 - 7.50 13.1 S-5 8.50 - 10.00 14.1 **B-7** S-3 4.00 - 5.50 9.9 **S-4** 6.00 - 7.50 15.5 **B-8** S-2 2.00 - 4.00 15.8 **S-3** 4.00 - 6.00 14.4 CL 36 16 20 77.6 **S-4** 6.00 - 8.0014.8 S-5 8.00 - 10.00 13.0 **B-9** S-2 2.00 - 4.00 15.4 S-3 4.00 - 6.00 8.9 **S-4** 6.00 - 8.007.5 26.8 S-5 15.3 8.00 - 10.00 **S-6** 23.6 13.00 - 15.00

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, Pl: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 3795

Project Name: City of Austin -Springdale/US Hwy 290 Water Improvements

PM: Emmett F. Irby
PE: Emmett F. Irby

Printed On: Wednesday, November 28, 2012



**ECS Texas, LLP** 

### **Laboratory Testing Summary** Page 2 of 5 Atterberg Limits<sup>3</sup> Moisture - Density (Corr.)5 Percent Sample Sample Depth MC1 Soil Passing CBR Maximum Optimum Other Type<sup>2</sup> Source Number (feet) (%) No. 200 Density Moisture Value<sup>6</sup> LL PL ы Sieve<sup>4</sup> (%) (pcf) B-10 **S-2** 4.00 - 5.50 22.4 S-3 6.00 - 8.0027.0 B-11 S-1 0.92 - 1.92 7.5 S-2 20.6 2.00 - 4.00 4.00 - 6.00 CL 44 15 29 69.7 S-3 17.7 **S-4** 6.00 - 8.0015.4 CL 40 16 24 65.2 B-12 S-1 0.00 - 2.0015.9 S-2 2.00 - 4.00 13.9 CH 53 17 36 73.8 S-3 4.00 - 6.00 12.0 **S-4** 6.00 - 8.00 12.2 CL 46 16 30 74.0 S-5 8.00 - 10.00 13.8 CL 45 14 31 70.8 B-13 S-1 0.00 - 2.00 12.9 S-2 2.00 - 4.00 13.0 4.00 - 6.00 2.5 S-3 8.7 6.00 - 7.50 S-4 3.8 **S-5** 8.50 - 10.00 26.6 CH 83 23 60 94.6 B-14 S-1 2.00 - 4.00 12.0 S-2 CL 14 4.00 - 6.00 10.3 27 13 67.0 S-3 6.00 - 8.00 9.3 CL 28 13 15 53.0 B-15 **S-2** 2.00 - 4.00 14.2 S-3 16.1 4.00 - 6.00 81.6 S-4 15.0 6.00 - 8.00

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, Pl: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

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**ECS Texas, LLP** 

### **Laboratory Testing Summary** Page 3 of 5 Atterberg Limits<sup>3</sup> Moisture - Density (Corr.)5 Percent Sample Sample Depth MC1 Soil Passing CBR Maximum Optimum Other Type<sup>2</sup> Source Number (feet) (%) No. 200 Density Moisture Value<sup>6</sup> PL LL ы Sieve<sup>4</sup> (%) (pcf) **S-5** 8.00 - 10.00 13.9 B-16 S-2 2.00 - 4.00 14.1 S-3 4.00 - 6.00 13.1 CL 43 16 27 79.0 S-4 6.00 - 8.00 13.7 S-5 8.00 - 10.00 14.2 B-17 S-2 2.00 - 4.00 13.6 S-3 4.00 - 6.00 14.2 32 S-4 6.00 - 8.0015.2 CL 48 16 79.8 **B-18** S-2 2.00 - 4.00 11.8 S-3 4.00 - 6.00 12.2 **S-4** 6.00 - 8.0012.5 S-5 14.2 8.00 - 10.00 B-19 S-2 2.00 - 4.00 20.3 S-3 4.00 - 6.00 7.6 **B-20** 0.00 - 1.50 S-1 13.1 **S-2** 2.00 - 3.50 6.8 S-3 4.00 - 5.50 6.0 CL 30 14 16 81.8 S-4 6.00 - 7.50 8.1 S-5 8.3 CL 32 13 19 87.5 8.50 - 10.00 CL 34 14 **S-6** 13.50 - 15.00 10.2 20 91.2 B-21 S-1 0.00 - 2.0015.4 S-2 2.00 - 3.50 8.9 CL 34 16 18 81.2

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, Pl: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 3795

Project Name: City of Austin -Springdale/US Hwy 290 Water Improvements

PM: Emmett F. Irby
PE: Emmett F. Irby

Printed On: Wednesday, November 28, 2012



**ECS Texas, LLP** 

#### **Laboratory Testing Summary** Page 4 of 5 Moisture - Density (Corr.)5 Atterberg Limits<sup>3</sup> Percent Sample Sample Depth MC1 Soil Passing CBR Maximum Optimum Other Type<sup>2</sup> Source Number (feet) (%) No. 200 Density Moisture Value<sup>6</sup> LL PL ы Sieve<sup>4</sup> (%) (pcf) **S-3** 7.8 4.00 - 5.50 CL 17 **S-4** 6.00 - 7.508.9 29 12 80.5 **S-5** 8.50 - 10.00 9.6 42 15 27 **S-6** 13.50 - 15.00 9.8 33 14 19 83.3 **B-22** 35 19 S-6 13.00 - 15.00 24.8 CL 16 49.7 S-7 18.50 - 20.00 SC 34 15 19 35.7 24.8 **B-23** S-5 8.00 - 10.00 10.7 SC 35 17 18 48.0 67 **S-7** 18.50 - 20.00 CH 24 43 95.1 18.7 B-24 S-3 4.00 - 6.00 10.3 S-5 8.00 - 10.00 18.6 CH 62 23 39 88.4 **S-8** 23.50 - 25.00 18.9 CH 71 23 48 97.9 **B-25** S-6 13.50 - 15.00 18.9 CH 63 22 41 95.2 **S-9** 29.17 - 30.00 14.0 61 21 40 B-26 S-2 2.50 - 4.00 21.5 **S-3** 4.00 - 6.00 18.9 **S-4** 6.00 - 8.0018.6 S-5 8.50 - 10.00 13.7 S-6 13.50 - 15.00 18.7 CH 60 21 39 92.1 **S-7** 18.50 - 20.00 CH 68 23 45 97.9 21.1 **S-8** 23.50 - 25.00 14.4 CH 56 18 38 91.1 B-27 B-28 S-2 10.9 2.00 - 4.00

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 3795

Project Name: City of Austin -Springdale/US Hwy 290 Water Improvements

PM: Emmett F. Irby
PE: Emmett F. Irby

Printed On: Wednesday, November 28, 2012



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#### **Laboratory Testing Summary** Page 5 of 5 Atterberg Limits<sup>3</sup> Moisture - Density (Corr.)5 Percent Sample Sample Depth MC1 Soil **Passing** CBR Maximum **Optimum** Other Type<sup>2</sup> **Source** Number (feet) (%) No. 200 Density Moisture Value<sup>6</sup> LL PLPΙ Sieve<sup>4</sup> (%) (pcf) **S-3** 4.00 - 5.50 17.9 **S-4** 6.00 - 7.50 20.6 **S-5** 8.50 - 10.00 19.7 **S-6** 13.50 - 15.00 23.1 **72** 23 49 98.7 **S-7** 18.50 - 20.00 24.6 CH СН 58 40 94.2 S-8 24.17 - 25.00 14.3 18 B-29 B-30 S-5 8.50 - 10.00 11.2 13.50 - 15.00 **S-6** 11.6 **S-7** 18.50 - 20.00 11.5 30.1 CH 74 52 96.6 **S-8** 23.50 - 25.00 25.0 22 B-31

Notes: 1. ASTM D 2216, 2. ASTM D 2487, 3. ASTM D 4318, 4. ASTM D 1140, 5. See test reports for test method, 6. See test reports for test method

**Definitions:** MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, Pl: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content (ASTM D 2974)

Project No. 3795

Project Name: City of Austin -Springdale/US Hwy 290 Water Improvements

PM: Emmett F. Irby
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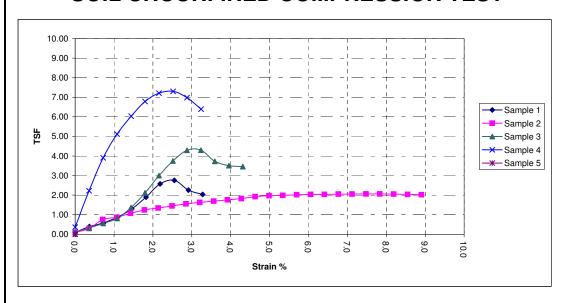
Printed On: Wednesday, November 28, 2012



**ECS Texas, LLP** 

Austin, TX

## **SOIL UNCONFINED COMPRESSION TEST**



Test Specimen	1	2	3	4	
Boring	B-8	B-10	B-16	B-17	
Sample	0	0	0	0	-
Sample Depth (ft.)	4-6	6-8	6-8	4-6	
Unconfined Compressive Strength (TSF)	2.75	2.06	4.30	7.30	-
Undrained Shear Strength (TSF)	1.38	1.03	2.15	3.65	
Strain at Failure (%)	2.6	7.1	3.2	2.5	-
Average Specimen Diameter (in.)	2.74	2.72	2.75	2.75	
Average Specimen Height (in.)	5.49	5.62	5.57	5.56	
Height to Diameter Ratio	2.0	2.1	2.0	2.0	
Moisture Content (%)	12.7	29.5	13.3	13.7	
Dry Unit Weight (lb/ft <sup>3</sup> )	110.0	92.2	110.2	114.1	
Void Ratio	0.532	0.828	0.529	0.477	
Saturation (%)	0.643	0.962	0.678	0.774	
Specific Gravity (assumed)	2.70	2.70	2.70	2.70	
USCS Soil Classification					
Remarks					

This report shall not be reproduced, except in full, without the written approval of the laboratory.

Test conducted in general accordance with ASTM D2166

Project Springe	dale/US 290 Water Systems Imp.
Project Number	17-3795
Date	11/16/2012

PROJECT: Springdale/US Hwy 290 Water Improvments

Initial Height (inches) 5.20

Project No: 3797

B-26

Initial Aver. Diameter (inches): 2.66

Boring No: 18'-20' Depth:

Date: 11/19/2012 Height to Diameter Ratio (target: 2.0 to 2.5): 2.0



## WD=134.1, DD=111.4

5.55 Initial Area (square inches):

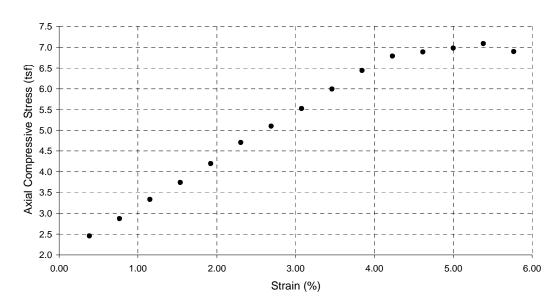
Elapsed	Dial	Axial	Axial	Corrected	Compressive	Axial	Compressive
Time	Reading	Load	Strain	Area	Stress	Strain	Stress
(min)	(inches)	(lbs)		(sq. in)	(tsf)	(%)	(psi)
0	0.020	190	0.0038	5.57	2.46	0.38	34
	0.040	223	0.0077	5.59	2.87	0.77	40
	0.060	260	0.0115	5.61	3.33	1.15	46
	0.080	293	0.0154	5.64	3.74	1.54	52
	0.100	330	0.0192	5.66	4.20	1.92	58
	0.120	371	0.0231	5.68	4.70	2.31	65
	0.140	404	0.0269	5.70	5.10	2.69	71
	0.160	439	0.0308	5.73	5.52	3.08	77
	0.180	478	0.0346	5.75	5.99	3.46	83
	0.200	516	0.0385	5.77	6.44	3.85	89
	0.220	546	0.0423	5.80	6.78	4.23	94
	0.240	556	0.0462	5.82	6.88	4.62	96
4.5	0.260	566	0.0500	5.84	6.98	5.00	97
	0.280	577	0.0538	5.87	7.08	5.38	98
	0.300	564	0.0577	5.89	6.89	5.77	96
	0.320	518	0.0615	5.91	6.31	6.15	88
				•			

Average strain rate:

1.11 % per minute (target: complete test in 2 to 15 minutes)

#### **Unconfined Compressive Strength Test Results**

Test Boring B-26, Sample from 18-20 feet



PROJECT: Springdale/US Hwy 290 Water Improvments

Initial Height (inches): 5.61

Project No: 3797

Boring No:

B-12

Initial Aver. Diameter (inches):

es): 2.75

2.0

Depth: 8'-10' Date: 11/19/2012

Height to Diameter Ratio (target: 2.0 to 2.5):

ECSLLP

#### WD=137.1, DD=120.0

Initial Area (square inches): 5.93

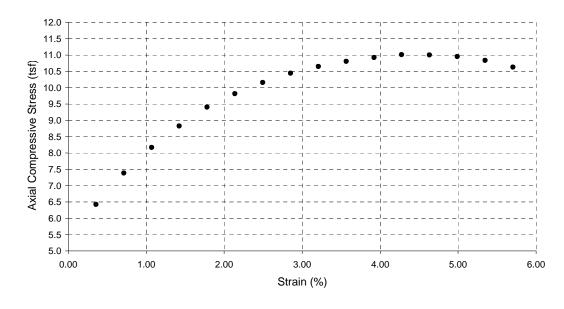
Elapsed Time	Dial Reading	Axial Load	Axial Strain	Corrected Area	Compressive Stress	Axial Strain	Compressive Stress
(min)	(inches)	(lbs)		(sq. in)	(tsf)	(%)	(psi)
0	0.020	531	0.0036	5.95	6.42	0.36	89
	0.040	612	0.0071	5.97	7.38	0.71	102
	0.060	680	0.0107	5.99	8.17	1.07	113
	0.080	737	0.0143	6.02	8.82	1.43	123
	0.100	788	0.0178	6.04	9.40	1.78	131
	0.120	826	0.0214	6.06	9.81	2.14	136
	0.140	858	0.0250	6.08	10.16	2.50	141
	0.160	885	0.0285	6.10	10.44	2.85	145
	0.180	906	0.0321	6.13	10.65	3.21	148
	0.200	923	0.0357	6.15	10.81	3.57	150
	0.220	936	0.0392	6.17	10.92	3.92	152
	0.240	947	0.0428	6.20	11.01	4.28	153
4.5	0.260	950	0.0463	6.22	11.00	4.63	153
	0.280	949	0.0499	6.24	10.95	4.99	152
	0.300	943	0.0535	6.27	10.84	5.35	151
	0.320	928	0.0570	6.29	10.62	5.70	148

Average strain rate:

1.03 % per minute (target: complete test in 2 to 15 minutes)

#### **Unconfined Compressive Strength Test Results**

Test Boring B-12, Sample from 8-10 feet



PROJECT: Springdale/US Hwy 290 Water Improvments

Initial Height (inches): 5.42

Project No: 3797

Boring No:

B-12

Initial Aver. Diameter (inches)

es): 2.75

2.0

Depth: 4'-6' Date: 11/19/2012

Height to Diameter Ratio (target: 2.0 to 2.5):

ECSLLP

#### WD=123.0, DD=110.3

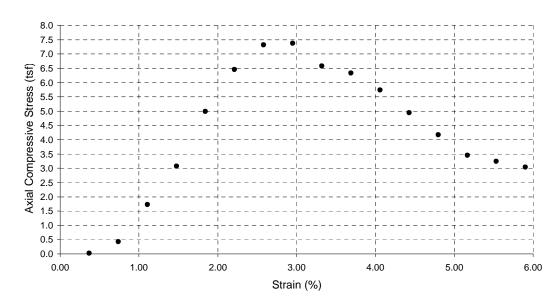
Initial Area (square inches): 5.93

Elapsed Time	Dial Reading	Axial Load	Axial Strain	Corrected Area	Compressive Stress	Axial Strain	Compressive Stress
(min)	(inches)	(lbs)	1	(sq. in)	(tsf)	(%)	(psi)
0	0.020	2	0.0037	5.95	0.02	0.37	0
	0.040	35	0.0074	5.97	0.42	0.74	6
	0.060	144	0.0111	6.00	1.73	1.11	24
	0.080	257	0.0148	6.02	3.07	1.48	43
	0.100	418	0.0185	6.04	4.98	1.85	69
	0.120	544	0.0221	6.06	6.46	2.21	90
	0.140	619	0.0258	6.09	7.32	2.58	102
	0.160	626	0.0295	6.11	7.38	2.95	102
	0.180	560	0.0332	6.13	6.57	3.32	91
	0.200	541	0.0369	6.16	6.33	3.69	88
	0.220	492	0.0406	6.18	5.73	4.06	80
	0.240	426	0.0443	6.20	4.94	4.43	69
4.5	0.260	361	0.0480	6.23	4.17	4.80	58
	0.280	300	0.0517	6.25	3.45	5.17	48
	0.300	282	0.0554	6.28	3.23	5.54	45
	0.320	266	0.0590	6.30	3.04	5.90	42
		·					

Average strain rate: 1.07 % per minute (target: complete test in 2 to 15 minutes)

## **Unconfined Compressive Strength Test Results**

Test Boring B-12, Sample from 4-6 feet



PROJECT: Springdale/US Hwy 290 Water Improvments

Initial Height (inches):

Project No: 3797

Boring No:

B-11

Initial Aver. Diameter (inches)

es): 2.73

5.58

2.0

Depth: 6'-8' Date: 11/19/2012

Height to Diameter Ratio (target: 2.0 to 2.5):

ECSLLP

## WD=121.5, DD=105.8

Initial Area (square inches): 5.85

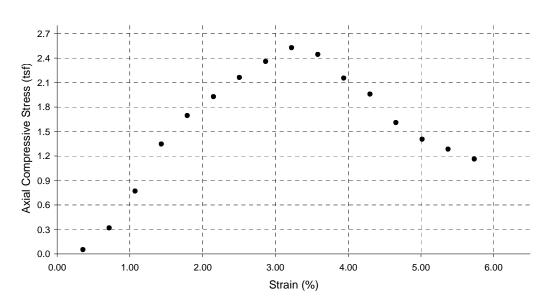
Elapsed Time (min)	Dial Reading (inches)	Axial Load (lbs)	Axial Strain	Corrected Area (sq. in)	Compressive Stress (tsf)	Axial Strain (%)	Compressive Stress (psi)
0	0.020	4	0.0036	5.87	0.05	0.36	1
	0.040	26	0.0072	5.89	0.32	0.72	4
	0.060	63	0.0108	5.91	0.77	1.08	11
	0.080	111	0.0143	5.94	1.35	1.43	19
	0.100	140	0.0179	5.96	1.69	1.79	24
	0.120	160	0.0215	5.98	1.93	2.15	27
	0.140	180	0.0251	6.00	2.16	2.51	30
	0.160	197	0.0287	6.02	2.36	2.87	33
	0.180	212	0.0323	6.05	2.53	3.23	35
	0.200	206	0.0358	6.07	2.44	3.58	34
	0.220	182	0.0394	6.09	2.15	3.94	30
	0.240	166	0.0430	6.11	1.96	4.30	27
4.5	0.260	137	0.0466	6.14	1.61	4.66	22
	0.280	120	0.0502	6.16	1.40	5.02	19
	0.300	110	0.0538	6.18	1.28	5.38	18
	0.320	100	0.0573	6.21	1.16	5.73	16

Average strain rate:

1.04 % per minute (target: complete test in 2 to 15 minutes)

## **Unconfined Compressive Strength Test Results**

Test Boring B-11, Sample from 6-8 feet



## COMPRESSIVE STRENGTH TEST RESULTS FOR ROCK CORES - ASTM D-2938



PROJECT: Springdale/Hwy 290 Water Improvments	<b>JOB#</b> : 3795
CLIENT:	<b>DATE</b> : 11/26/2012

BORING NO.	DEPTH (Feet)	DIAMETER (in)	LENGTH (in)	AREA (sq in)	LOAD (lbs)	UNCONFINED COMPRESSIVE STRENGTH (psi)	LENGTH TO DIAMETER RATIO	CORR. FACTOR *	CORRECTED COMPRESSIVE STRENGTH (psi)	TONS PER SQUARE FOOT (tsf)
B-25	35	2.020	4.090	3.200	3670	1147	2.02	1.0000	1147	83

REMARKS:			

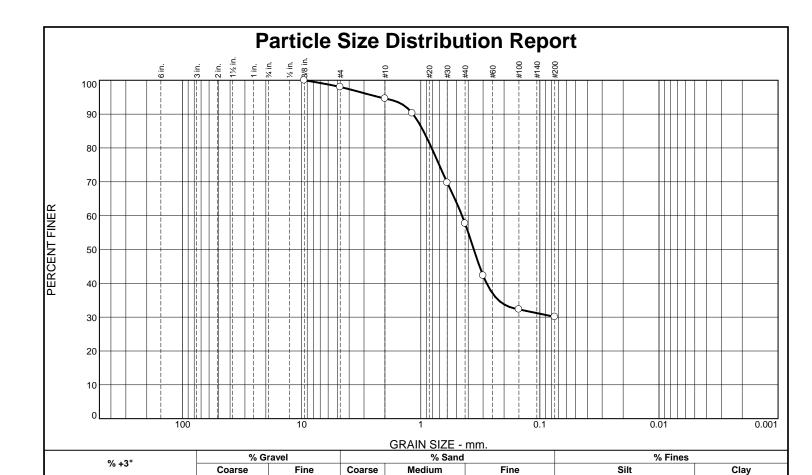
## COMPRESSIVE STRENGTH TEST RESULTS FOR ROCK CORES - ASTM D-2938



PROJECT: Springdale/Hwy 290 Water Improvments	<b>JOB#:</b> 3795
OLIENT	DATE 44/40/0040
CLIENT:	DATE: 11/16/2012

BORING NO.	DEPTH (Feet)	DIAMETER (in)	LENGTH (in)	AREA (sq in)	LOAD (lbs)	UNCONFINED COMPRESSIVE STRENGTH (psi)	LENGTH TO DIAMETER RATIO	CORR. FACTOR *	CORRECTED COMPRESSIVE STRENGTH (psi)	TONS PER SQUARE FOOT (tsf)
B-23	33	2.040	4.150	3.260	3010	923	2.03	1.0000	923	66

REMARKS:			



36.9

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/8	100.0		
#4	98.0		
#10	94.6		
#16	90.3		
#30	69.7		
#40	57.7		
#50	42.3		
#100	32.3		
#200	30.1		

0.0

2.0

3.4

CLAY, Sandy, Silty	Material Description CLAY, Sandy, Silty, Yellowish Brown, Dry, Hard, (CL)				
PL=	Atterberg Limits LL=	PI=			
D <sub>90</sub> = 1.1635 D <sub>50</sub> = 0.3588 D <sub>10</sub> =	Coefficients D85= 0.9503 D30= Cu=	D <sub>60</sub> = 0.4503 D <sub>15</sub> = C <sub>c</sub> =			
USCS= CL	Classification AASHTO	)=			
<u>Remarks</u>					

30.1

(no specification provided)

0.0

**Source of Sample:** B-30 **Sample Number:** S-7 **Depth:** 18.50

**Date:** 11-16-12



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Austin, TX 78758

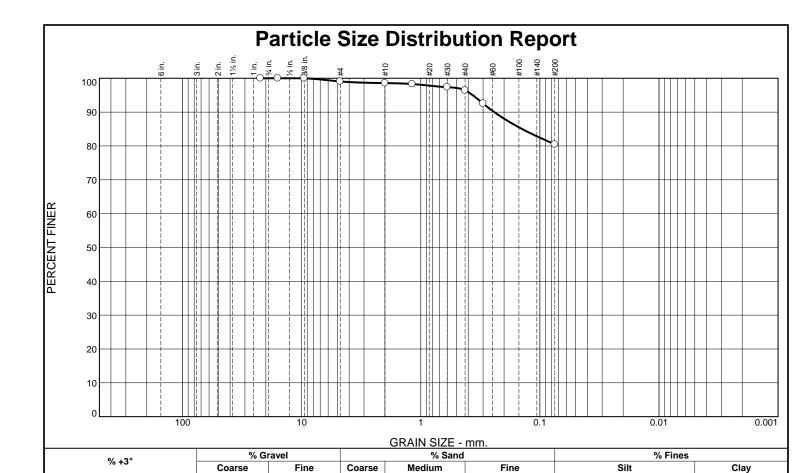
Phone: (512) 837-8005 Fax: (512) 519-7361 Client:

City of Austin -Springdale/US Hwy 290 Water Improvements Project:

27.6

**Project No: Figure** 

Tested By: C. Taylor Checked By: E. Irby P.E.



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
7/8	100.0		
5/8	100.0		
3/8	100.0		
#4	99.1		
#10	98.6		
#16	98.3		
#30	97.4		
#40	96.4		
#50	92.5		
#200	80.5		

0.0

0.9

0.5

2.2

CLAY, Sandy, Silty	Material Description CLAY, Sandy, Silty, Brown to Tan, Very Stiff to Hard, (CL)				
PL= 12	Atterberg Limits LL= 29	Pl= 17			
D <sub>90</sub> = 0.2415 D <sub>50</sub> = D <sub>10</sub> =	$\begin{array}{c} \underline{\text{Coefficients}} \\ \text{D}_{85} =  0.1410 \\ \text{D}_{30} =  \\ \text{C}_{\text{U}} =  \end{array}$	D <sub>60</sub> = D <sub>15</sub> = C <sub>c</sub> =			
USCS= CL	Classification AASHTO	D= A-6(11)			
	<u>Remarks</u>				

80.5

**Date:** 11-15-12

\* (no specification provided)

0.0

Source of Sample: B-21 Depth: 6.00-7.50 Sample Number: S-4

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Phone: (512) 837-8005

Fax: (512) 519-7361

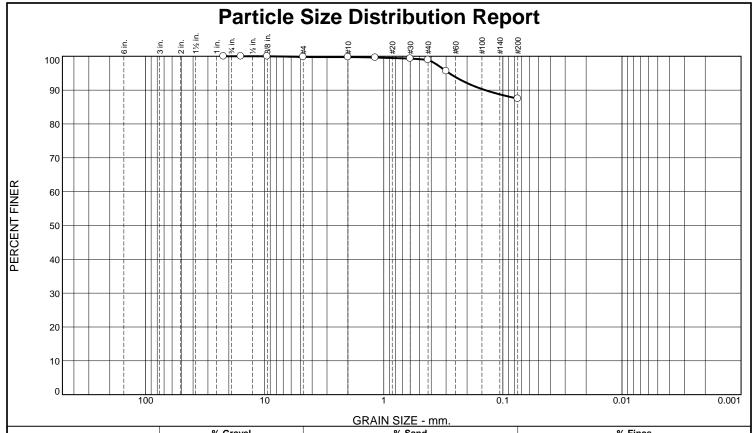
Client: City of Austin

**Project:** City of Austin -Springdale/US Hwy 290 Water Improvements

15.9

Project No: 3795 Figure

Tested By: C. Taylor Checked By: E. Irby P.E.



% +3" Coars	% Gravel		% Sand		% Fines		
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.0	0.9	11.4	87.5	

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
7/8	100.0		
5/8	100.0		
3/8	100.0		
#4	99.8		
#10	99.8		
#16	99.6		
#30	99.3		
#40	98.9		
#50	95.6		
#200	87.5		

CLAY, Sandy, Silty	Material Description CLAY, Sandy, Silty, Brown to Tan, Stiff to Hard, (CL)					
PL= 13	Atterberg Limits LL= 32	PI= 19				
D <sub>90</sub> = 0.1410 D <sub>50</sub> = D <sub>10</sub> =	Coefficients D85= D30= Cu=	D <sub>60</sub> = D <sub>15</sub> = C <sub>c</sub> =				
USCS= CL	Classification AASHTO	)= A-6(15)				
	<u>Remarks</u>					

**Date:** 11-26-12

(no specification provided)

Source of Sample: B-20 Sample Number: S-5**Depth:** 8.50-10.00

ECS Texas, LLP

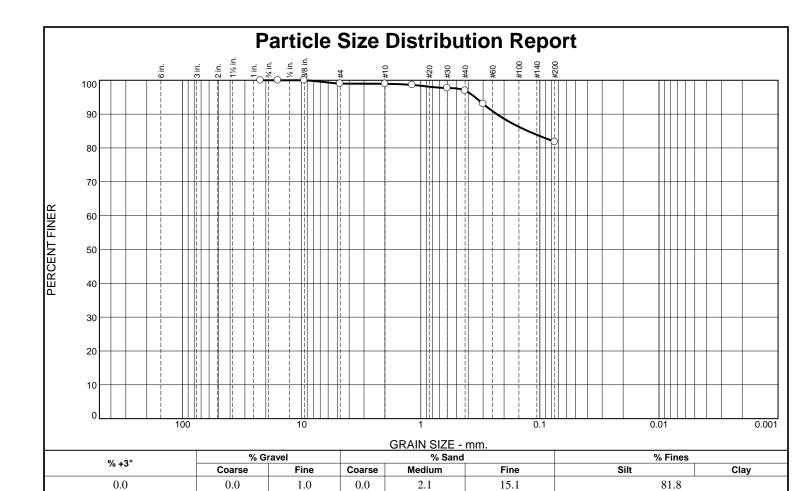
2120 Denton Drive, Suite 105 Austin, TX 78758

Phone: (512) 837-8005 Fax: (512) 519-7361 Client: City of Austin

City of Austin -Springdale/US Hwy 290 Water Improvements Project:

**Project No: Figure** 

Tested By: C. Taylor Checked By: E. Irby P.E.



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
7/8	100.0		
5/8	100.0		
3/8	100.0		
#4	99.0		
#10	99.0		
#16	98.6		
#30	97.7		
#40	96.9		
#50	93.0		
#200	81.8		

CLAY, Sandy, Silty	Material Description , Brown to Tan, Stiff to I	='
PL= 14	Atterberg Limits LL= 30	PI= 16
D <sub>90</sub> = 0.2300 D <sub>50</sub> = D <sub>10</sub> =	$\begin{array}{c} \textbf{Coefficients} \\ \textbf{D}_{85} = & 0.1260 \\ \textbf{D}_{30} = \\ \textbf{C}_{\textbf{U}} = \end{array}$	D <sub>60</sub> = D <sub>15</sub> = C <sub>c</sub> =
USCS= CL	Classification AASHTO	D= A-6(11)
	<u>Remarks</u>	

**Date:** 11-26-12

\* (no specification provided)

**Source of Sample:** B-20 **Depth:** 4.00-5.50 **Sample Number:** S-3

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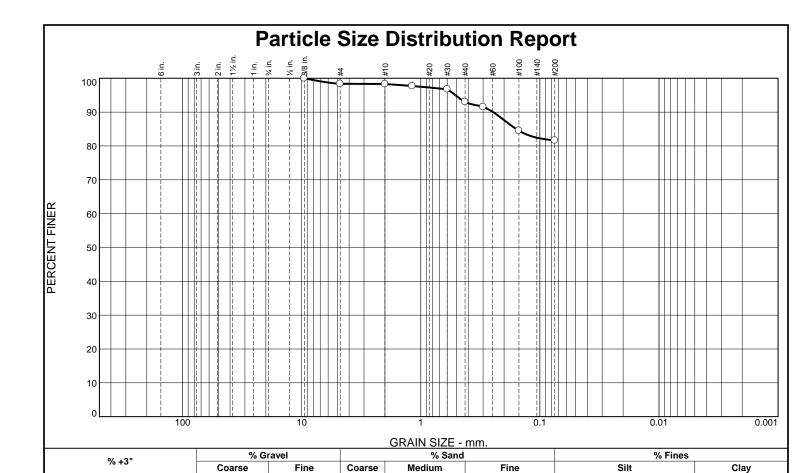
Phone: (512) 837-8005

Fax: (512) 519-7361

Client: City of Austin

**Project:** City of Austin -Springdale/US Hwy 290 Water Improvements

Project No: 3795 Figure



5.3

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/8	100.0		
#4	98.4		
#10	98.3		
#16	97.7		
#30	96.8		
#40	93.0		
#50	91.5		
#100	84.5		
#200	81.6		
L *			

0.0

1.6

0.1

CLAY, Sandy, Silt Hard, (CL)	Material Description y, With Calcareous Depos	asits, Tannish Brown, Dry,
PL=	Atterberg Limits LL=	Pl=
D <sub>90</sub> = 0.2470 D <sub>50</sub> = D <sub>10</sub> =	Coefficients D <sub>85</sub> = 0.1581 D <sub>30</sub> = C <sub>U</sub> =	D <sub>60</sub> = D <sub>15</sub> = C <sub>c</sub> =
USCS= CL	Classification AASHTO	D=
	<u>Remarks</u>	

81.6

**Date:** 11-16-12

(no specification provided)

0.0

**Source of Sample:** B-15 **Sample Number:** S-3 **Depth:** 4.00

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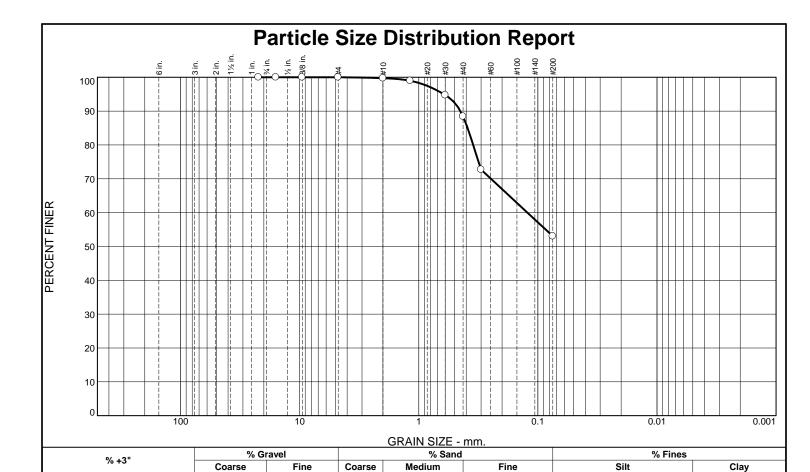
Phone: (512) 837-8005 Fax: (512) 519-7361 Client:

City of Austin -Springdale/US Hwy 290 Water Improvements Project:

11.4

**Project No: Figure** 

Tested By: C. Taylor Checked By: E. Irby P.E.



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
7/8	100.0		
5/8	100.0		
3/8	100.0		
#4	100.0		
#10	99.7		
#16	99.0		
#30	94.7		
#40	88.4		
#50	72.7		
#200	53.0		

0.0

0.0

0.3

11.3

CLAY, Silty, Sandy (CL)	Material Description , Dark Brown to Light Br	
PL= 13	Atterberg Limits LL= 28	PI= 15
D <sub>90</sub> = 0.4472 D <sub>50</sub> = D <sub>10</sub> =	Coefficients D85= 0.3891 D30= Cu=	D <sub>60</sub> = 0.1224 D <sub>15</sub> = C <sub>c</sub> =
USCS= CL	Classification AASHTO	)= A-6(4)
	<u>Remarks</u>	

53.0

**Date:** 11-26-12

(no specification provided)

**Source of Sample:** B-14 **Sample Number:** S-3

**Depth:** 6.00-8.00

0.0

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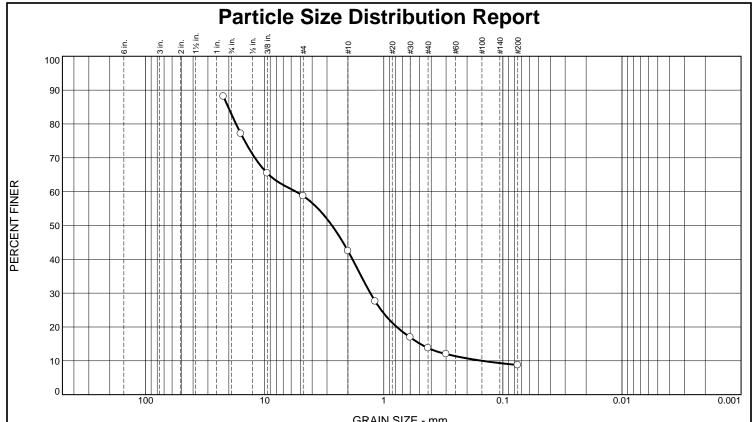
Phone: (512) 837-8005 Fax: (512) 519-7361 Client:

Project: City of Austin -Springdale/US Hwy 290 Water Improvements

35.4

**Project No: Figure** 

Tested By: C. Taylor Checked By: E. Irby



				GRAIN SIZE -	111111.		
% <b>+</b> 3"	% G	ravel		% Sand		% Fines	
76 <b>+3</b>	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
		24.2	16.2	28.7	5.1	8.7	

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
7/8	88.1		
5/8	77.1		
3/8	65.4		
#4	58.7		
#10	42.5		
#16	27.6		
#30	16.9		
#40	13.8		
#50	12.0		
#200	8.7		

SAND, Silty, C Hard, (SC)	Material Description Clayey, Dark Brown to Light B	rown to Tan, Dry to Moist,
PL=	Atterberg Limits LL=	PI=
D <sub>90</sub> = D <sub>50</sub> = 2.7229 D <sub>10</sub> = 0.1490	$\begin{array}{c} \textbf{Coefficients} \\ \textbf{D}_{85} = 20.2610 \\ \textbf{D}_{30} = 1.2980 \\ \textbf{C}_{\textbf{U}} = 36.67 \end{array}$	D <sub>60</sub> = 5.4635 D <sub>15</sub> = 0.4944 C <sub>c</sub> = 2.07
USCS= SC	Classification AASHTO:	=
	<u>Remarks</u>	

**Date:** 11-26-12

(no specification provided)

Source of Sample: B-13 Depth: 4.00-6.00 Sample Number: S-3

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2120 Denton Drive, Suite 105

Austin, TX 78758

Phone: (512) 837-8005 Fax: (512) 519-7361

Client: City of Austin

**Project:** City of Austin -Springdale/US Hwy 290 Water Improvements

Project No: 3795 Figure

Tested By: C. Taylor Checked By: E. Irby P.E.

**Emmett Irby ECS** Texas 2120 Denton Drive Suite# 105 Austin, TX 78758

**Control** # 96457

17-3795 **Project** 

Matrix soil Sample B-27 4'-6' **Date/Time Rec'd** Nov 14, 2012 14:56

**Date/Time Taken** Nov 13, 2012

## **Report of Analytical Data**

Analyte	Result	<u>Units</u>	SQL Date/Time R	Run By	Method	RPD Limit	<u>MS</u>	MSD	<u>Limit</u>	LCS LCSD	Limit
Conductance	1,200	$\mu S/cm$	11/26/12 16	6:15 CTP	120.1	5.9					
pН	8.1		11/19/12 13	3:13 RDO	150.1	2.0 10					
Chloride	31	mg/Kg	1 11/19/12 13	3:38 RDO	9253	5.7 16	109.3	103.2	41-160	106.9 106.9	81-126
Sulfate	910	mg/Kg	13.19 11/26/12 18	8:45 MCK	6010	2.9 18	100.4	103.4	75-125	103.5 103.0	89-118

SQL - sample quantification limit

RPD - MS/MSD precision MS - matrix spike recovery MSD - matrix spike duplicate recovery

LCS/LCSD- laboratory control standard/duplicate recovery

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Methods from laboratory SOP based on reference method unless otherwise noted.

Respectfully submitted,

Mark C. Krause

**Emmett Irby ECS** Texas 2120 Denton Drive Suite# 105 Austin, TX 78758

**Control** # 96458

17-3795 **Project** 

Matrix soil Sample B-29 23'-25' **Date/Time Rec'd** Nov 14, 2012 14:56

**Date/Time Taken** Nov 13, 2012

## **Report of Analytical Data**

Analyte	Result	<u>Units</u>	SQL Date/Time	e Run By	Method	RPD Limit	<u>MS</u>	MSD	<u>Limit</u>	LCS LC	SD Limit
Conductance	17,000	$\mu S/cm$	11/26/12	16:15 CTP	120.1	5.9					
pН	8.5		11/19/12	13:13 RDO	150.1	2.0 10					
Chloride	49	mg/Kg	1 11/19/12	13:38 RDO	9253	5.7 16	109.3	103.2	41-160	106.9 10	6.9 81-126
Sulfate	17,000	mg/Kg	12.04 11/26/12	18:50 MCK	6010	2.9 18	100.4	103.4	75-125	103.5 10	3.0 89-118

SQL - sample quantification limit

RPD - MS/MSD precision MS - matrix spike recovery MSD - matrix spike duplicate recovery

LCS/LCSD- laboratory control standard/duplicate recovery

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Methods from laboratory SOP based on reference method unless otherwise noted.

Respectfully submitted,

Mark C. Krause

**Emmett Irby ECS** Texas 2120 Denton Drive Suite# 105 Austin, TX 78758

**Control** # 96459

17-3795 Project

Matrix soil Sample B-31 81/2-10 **Date/Time Rec'd** Nov 14, 2012 14:56

**Date/Time Taken** Nov 13, 2012

## **Report of Analytical Data**

Analyte	Result	<u>Units</u>	SQL Date/Tir	ne Run	<u>В</u> у	Method	RPD Lim	t MS	<b>MSD</b>	<u>Limit</u>	<b>LCS</b>	<b>LCSD</b>	<u>Limit</u>
Conductance	860	$\mu S/cm$	11/26/12	16:15	CTP	120.1	5.9						
pН	8.4		11/19/12	13:13 I	RDO	150.1	2.0 10						
Chloride	180	mg/Kg	1 11/19/12	13:38 I	RDO	9253	5.7 16	109.3	103.2	41-160	106.9	106.9	81-126
Sulfate	770	mg/Kg	13.29 11/26/12	18:56 N	MCK	6010	2.9 18	100.4	103.4	75-125	103.5	103.0	89-118

SQL - sample quantification limit

RPD - MS/MSD precision MS - matrix spike recovery MSD - matrix spike duplicate recovery

LCS/LCSD- laboratory control standard/duplicate recovery

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Methods from laboratory SOP based on reference method unless otherwise noted.

Respectfully submitted,

Mark C. Krause

EGA

ECS TEXAS, LLP

2120 Denton Drive, Suite 104, Austin, Texas 78758

Project #

Chain of Custody

Results To:				Ĺ	1.1	-3	379	1.5		1234	38		
Client Name  ECS TOXAS  Mailing Address		E-mall E/RBY @ ECS/11 Phone # 5/2-8-37-80	mited.com			An	alyses	Requested	i	Turnaround Time/Re	sults/invoice		oliance toring
2120 Denton Drive	Suite 105 Report Attention 8758 EMMET	=ax #	20 5	of Containers						24 Hr: □ 41	Hr.  Day:  Day:  Day:	Ye	es:
Mailing Address  City State  Sampled by:	Zip Involce Attention	Phone # =ax # :		Number of		sistium	lonale	y		Date Sent: Send Results Via: Mall: □ Email;这 Fax	c Phone: □	Lab Us Sub-S	se Only
I attest to the validity and authenticity of the sample. I mislabeling the sample location, date or time is considered. Date Time Sample Sampled Sampled Type*	Signature: am aware that tampering with or in ered fraud and may be grounds for Sample Ide	legal action.	Preservative* See Key Below		#. Q	Resign	بمالان	Salta		Send Invoice Via:  Mail: Email: Fax		pi	н
	3-27 4'-6		6		$\mathbb{Z}$		Z			Remarks 96457		<2	>12
	3-29 231-5		6		$\langle \rangle$	4	4	A+		96458			
										96459			
						-	_						
Signature		Print Nam	ne					Company		Date			
Rellinguished By: Markil C	) Well	, Marie Marie		E	CS	5	lim.	7		11/14/12_	1456	3	
Relinquished By:		· · · · · · · · · · · · · · · · · · ·											
Received By: Relinquished By:													
Received By Laboratory:	A	CHRUS EN	ent		Av					11	1115	,	
Yes: No: None: None:	amples are discarded 30 days after OC apply only to the samples as the		rangements are made.	Haza	rdous es	mplace	ohumad i	to client or dispo d for the report.	sed of at client ex	pense. The analytical results associates: Net thirty (30) days on approv	i	SEM	
Sample Temperature  * K  Degrees C	EY: Sample Type Preservative:	: 1=Drinking Water, 2=S 1=NaOH, 2=NaOH + Zn	ourface Water, OAC, 3=HNO3,	3≃Gr 4≃H	ound 2804	Wat	er, 4=\	Waste Wat	er 5=Soil 6		· ·	For Revia	sed
													i

```
10002,10093796.7275,3143257.3237,515.741,BH/NG
  B4,10093671.8998,3142117.2114,541.6,APPROX LOCATION,HOLE NOT FOUND
10005,10093682.1259,3141643.0080,555.454,BH/NG
10006,10094013.9517,3141699.0759,557.102,BH/ASPH PLUG
10007,10094998.8482,3142055.8552,553.599,BH/ASPH PLUG
10008,10095598.1236,3142237.0934,549.634,BH/NG
10009,10096028.8909,3142392.3876,551.067,BH/NG
10010,10096413.6085,3142658.5011,539.997,BH/NG
10011,10096809.8613,3143118.8830,522.565,BH/ASPH PLUG
10012,10096990.8916,3143358.6850,527.779,BORE HOLE
10013,10094914.9637,3142668.5443,533.568,BH/NG
10014,10095176.0097,3142210.8657,550.862,BH/ASPH PLUG
10015,10095733.5046,3141874.5106,562.643,BH/ASPH PLUG
10016,10095797.1942,3142605.1161,529.214,BH/ASPH PLUG
A10017,10096099.1183,3142771.3301,524.836,BOREHOLE
B10017,10096097.6138,3142766.6735,525.083,BOREHOLE
10018,10096388.4213,3142260.7352,564.027,BH/NG
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10001,10093881.0928,3143894.7425,534.087,BH/NG

10019,10096586.8155,3141799.0460,567.341,BORE HOLE 10020,10096095.0238,3141522.2003,561.035,BORE HOLE

10022,10093839.5807,3143604.9214,504.539,BH/MW

10024,10093747.9212,3142616.1377,529.412,BH/MW 10025,10093719.8505,3142295.1812,526.780,BH/NG

10027,10096720.8841,3142976.1231,520.899,BH/MW 10028,10094646.2375,3141953.9754,532.302,BH/MW

10021,10094895.6027,3141205.1892,559.355,BH/LATH-NO HOLE

10023,10093828.2756,3143506.6780,507.307,BORE HOLE/MW

10026,10096569.3217,3142828.3066,526.581,BH/ASPH PLUG

10029,10094498.1924,3141851.3739,529.616,BH/ASPH PLUG 10030,10095852.1065,3141412.3611,547.509,BOREHOLE 10031,10095690.1822,3141322.3600,543.920,BOREHOLE

Borehole Locations: Surface US 290 Water Systems ECS TEXAS, LLP

> Located On: 11/15/2012 11/19/2012

11/27/2012

10031	10030	10029	10028	10027	10026	10025	10024	10023	10022	10021	10020	10019	10018	B10017	A10017	10016	10015	10014	10013	10012	10011	10010	10009	10008	10007	10006	10005		B4*	В3	10002	10001	Borehole ID
10095690.2889	10095852.2249	10094498.2132	10094646.2690	10096721.0650	10096569.4917	10093719.8153	10093747.8880	10093828.2482	10093839.5541	10094895.6522	10096095.1596	10096586.9867	10096388.5782	10096097.7498	10096099.2544	10095797.3086	10095733.6144	10095176.0794	10094915.0145	10096991.0920	10096810.0486	10096413.7673	10096029.0220	10095598.2236	10094998.9051	10094013.9377	10093682.0880		10093671.8612		10093796.6979	10093881.0692	Northing
3141322.1759	3141412.1835	3141851.2279	3141953.8368	3142976.0581	3142828.2310	3142295.0672	3142616.0468	3143506.6512	3143604.9016	3141204.9967	3141522.0306	3141798.8963	3142260.6187	3142766.5934	3142771.2503	3142605.0244	3141874.3663	3142210.7456	3142668.4572	3143358.6475	3143118.8283	3142658.4132	3142392.2805	3142236.9752	3142055.7240	3141698.9190	3141642.8470		3142117.0846	:	3143257.2790	3143894.7436	Easting
543.9	547.5	529.6	532.3	520.9	526.6	526.8	529.4	507.3	504.5	559.4	561.0	567.3	564.0	525.1	524.8	529.2	562.6	550.9	533.6	527.8	522.6	540.0	551.1	549.6	553.6	557.1	555.5		541.6		515.7	534.1	Ortho Elevation
BOREHOLE	BOREHOLE	BH/ASPH PLUG	BH/MW	BH/MW	BH/ASPH PLUG	BH/NG	BH/MW	BORE HOLE/MW	BH/MW	BH/LATH-NO HOLE	BORE HOLE	BORE HOLE	BH/NG	BOREHOLE	BOREHOLE	BH/ASPH PLUG	BH/ASPH PLUG	BH/ASPH PLUG	BH/NG	BORE HOLE	BH/ASPH PLUG	BH/NG	BH/NG	BH/NG	BH/ASPH PLUG	BH/ASPH PLUG	BH/NG	Not Found.	Approx Location, Hole		BH/NG	BH/NG	Description
B31 "Observation Monitoring Well", 50' written on lathe.	B30 Asphalt Plug, 30' +- Northwest of Lathe	B29, Asphalt Plug	B28 "Observation Monitoring Well", 50' written on lathe.	B27 "Observation Monitoring Well", 50' written on lathe.		B25, Natural Ground, 50' written on lathe.		B23 "Observation Monitoring Well", 50' written on lathe.	B22 "Observation Monitoring Well", 50' written on lathe.	B21, 15' written on lathe. Located at lathe.	B20, 15' written on lathe.	B19, 15' written on lathe.		Southern Option	Northern Option	B16, Asphalt Plug, 15' written on lathe.	B15, Asphalt Plug, 15' written on lathe.	B14, Asphalt Plug, 15' written on lathe.	B13, Natural Ground, 15' written on lathe.	B12, 15' written on lathe.	B11, Asphalt Plug, 15' written on lathe.	B10, Natural Ground, 15' written on lathe.	B9, Natural Ground, 15' written on lathe.	B8, Natural Ground, 15' written on lathe.	B7, Asphalt Plug, 15' written on lathe.	B6, Top of Ashalt Plug, no lathe only paint	B5, Natural Ground, 15' written on lathe.		* "Within 10' of B4"-Hamilton McRae, PE Ranger/Austin Geo-Logic	Not Drilled	B2, Natural Ground, 15' written on lathe.	B1, Natural Ground, 15' written on lathe.	Comments

# Note:

Bearing Basis: Texas State Plane Coordinate System, Central Zone, NAD83, Based on OPUS Solution Combined Scale Factor = 0.999928

ECS Texas, LLP US 290 Water Systems Job #121003 FB:340 338 Crew: MK, JC CAF, JC



Located On: 11/15/2012 11/19/2012

11/27/2012

Borehole ID	Northing	Easting	Ortho Elevation	Description	Comments
10001	10093881.0928	3143894.7425	534.1	BH/NG	B1, Natural Ground, 15' written on lathe.
10002	10093796.7275	3143257.3237	515.7	BH/NG	B2, Natural Ground, 15' written on lathe.
B3					Not Drilled
B4*	10093671.8998	3142117.2114	541.6	Approx Location, Hole Not Found.	* "Within 10' of B4"-Hamilton McRae, PE Ranger/Austin Geo-Logic
10005	10093682.1259	3141643.0080	555.5	BH/NG	B5, Natural Ground, 15' written on lathe.
10006	10094013.9517	3141699.0759	557.1	BH/ASPH PLUG	B6, Top of Ashalt Plug, no lathe only paint
10007	10094998.8482	3142055.8552	553.6	BH/ASPH PLUG	I 👡 🛮
10008	10095598.1236	3142237.0934	549.6	BH/NG	B8, Natural Ground, 15' written on lathe.
10009	10096028.8909	3142392.3876	551.1	BH/NG	B9, Natural Ground, 15' written on lathe.
10010	10096413.6085	3142658.5011	540.0	BH/NG	B10, Natural Ground, 15' written on lathe.
10011	10096809.8613	3143118.8830	522.6	BH/ASPH PLUG	B11, Asphalt Plug, 15' written on lathe.
10012	10096990.8916	3143358.6850	527.8	BORE HOLE	B12, 15' written on lathe.
10013	10094914.9637	3142668.5443	533.6	BH/NG	B13, Natural Ground, 15' written on lathe.
10014	10095176.0097	3142210.8657	550.9	BH/ASPH PLUG	B14, Asphalt Plug, 15' written on lathe.
10015	10095733.5046	3141874.5106	562.6	BH/ASPH PLUG	B15, Asphalt Plug, 15' written on lathe.
10016	10095797.1942	3142605.1161	529.2	BH/ASPH PLUG	B16, Asphalt Plug, 15' written on lathe.
A10017	10096099.1183	3142771.3301	524.8	BOREHOLE	Northern Option
B10017	10096097.6138	3142766.6735	525.1	BOREHOLE	Southern Option
10018	10096388.4213	3142260.7352	564.0	BH/NG	B18, Natural Ground, 15' written on lathe.
10019	10096586.8155	3141799.0460	567.3	BORE HOLE	B19, 15' written on lathe.
10020	10096095.0238	3141522.2003	561.0	BORE HOLE	B20, 15' written on lathe.
10021	10094895.6027	3141205.1892	559.4	BH/LATH-NO HOLE	B21, 15' written on lathe. Located at lathe.
10022	10093839.5807	3143604.9214	504.5	BH/MW	B22 "Observation Monitoring Well", 50' written on lathe.
10023	10093828.2756	3143506.6780	507.3	BORE HOLE/MW	B23 "Observation Monitoring Well", 50' written on lathe.
10024	10093747.9212	3142616.1377	529.4	BH/MW	B24 "Observation Monitoring Well", 50' written on lathe.
10025	10093719.8505	3142295.1812	526.8	BH/NG	B25, Natural Ground, 50' written on lathe.
10026	10096569.3217	3142828.3066	526.6	BH/ASPH PLUG	B26, Asphalt Plug
10027	10096720.8841	3142976.1231	520.9	BH/MW	B27 "Observation Monitoring Well", 50' written on lathe.
10028	10094646.2375	3141953.9754	532.3	BH/MW	B28 "Observation Monitoring Well", 50' written on lathe.
10029	10094498.1924	3141851.3739	529.6	BH/ASPH PLUG	B29, Asphalt Plug
10030	10095852.1065	3141412.3611	547.5	BOREHOLE	B30 Asphalt Plug, 30' +- Northwest of Lathe
10031	10095690.1822	3141322.3600	543.9	BOREHOLE	B31 "Observation Monitoring Well", 50' written on lathe.

# Note:

Bearing Basis: Texas State Plane Coordinate System, Central Zone, NAD83, Grid Based on OPUS Solution Combined Scale Factor = 0.999928

ECS Texas, LLP US 290 Water Systems Job #121003 FB:340 338 Crew: MK, JC CAF, JC



The undersigned, in compliance with the Invitation for Bids for construction of the following Project for the City of Austin, Texas:

Solicitation No.:	IFB 6100 CLMC847
Project:	Springdale/290 Water Line Improvements
CIP ID No.:	6935.022

Having examined the Project Manual, Drawings and Addenda, the site of the proposed Work and being familiar with all of the conditions surrounding construction of the proposed Project, having conducted all inquiries, tests and investigations deemed necessary and proper; hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment, and incidentals, and to perform all Work required for construction of the Project in accordance with the Project Manual, Drawings and Addenda within the time indicated.

Note: The Bidder will enter the line item subtotal in the "Amount" column below, which is the product of the estimated "Quantity" multiplied by the "Unit Price". Any mathematical errors will be corrected for the purpose of determining the correct Amount to be entered in the Bid Form. The Amounts, including any corrected Amounts, will then be totaled to determine the actual amount of the Bid.

Bid Item	Qty.	Unit	Item Description	Unit Price	Amount
104S-A:	840	LF	Remove P.C. Concrete Curb	\$	\$
315S-A:	23105	SY	Surface Milling	\$	\$
340S-B3C:	6845	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	\$	\$
340S-B2D:	20955	SY	Hot Mix Asphaltic Concrete Pavement, 2 Inches, Type D	\$	\$
430S-A:	840	LF	P.C. Concrete Curb and Gutter (Excavation)	\$	\$
432S-RP- 1:	1	EA	P.C. Sidewalk Curb Ramp with Pavers (Type I)	\$	\$
432SR-4:	395	SF	Reconstruct Concrete Sidewalks to 4 Inch thickness, including removal of existing sidewalk	\$	\$
433S-C:	505	SF	Type II P.C. Concrete Driveway	\$	\$
434S:	265	SF	6 Inch P.C. Concrete Medians and Islands	\$	\$
504S-3G:	5	EA	Adjusting Gas Valve Box to Grade	\$	\$
504S-3W:	5	EA	Adjusting Water Valve Box to Grade	\$	\$
505S-B16:	20	LF	Encasement Pipe 16" Dia., Type Steel	\$	\$
505S-B24:	182	LF	Encasement Pipe 24" Dia., Type Steel	\$	\$

Bid Item	Bid Item Qty. Unit Item Description		Unit Price	Amount	
505S-B36:	126	LF	Encasement Pipe 36" Dia., Type Steel	\$	\$
509S-1:	14025	LF	Trench Excavation Safety Protective Systems (all depths)	\$	\$
510- BW2x5/8:	36	EA	Connecting New 2" HDPE Service to Existing Private Service (2" HDPE Dia. New Service to 5/8" Dia. Private Service), (Single Service)	\$	\$
510- BW2x5/8D S:	15	EA	Connecting New 2" HDPE Service to Existing Private Service (2" HDPE Dia. New Service to 5/8" Dia. Private Service), (Double Service)	\$	\$
510- BW2x3/4:	2	EA	Connecting New 2" HDPE Service to Existing Private Service (2" HDPE Dia. New Service to 3/4" Dia. Private Service), (Single Service)	\$	\$
510- BW2x3/4D S:	1	EA	Connecting New 2" HDPE Service to Existing Private Service (2" HDPE Dia. New Service to 3/4" Dia. Private Service), (Double Service)	\$	\$
510- BW2x1DS:	1	EA	Connecting New 2" HDPE Service to Existing Private Service (2" HDPE Dia. New Service to 1" Dia. Private Service), (Double Service)	\$	\$
510-FW:	100	LF	Concrete Trench Cap, 5 Ft. Width (Required Type V Cement for Concrete)	\$	\$
510- JW6x6:	7	EA	Wet Connections, 6" Dia. x 6" Dia.	\$	\$
510- JW8x8:	13	EA	Wet Connections, 8" Dia. x 8" Dia.	\$	\$
510- JW12x12:	1	EA	Wet Connections, 12" Dia. x 12" Dia.	\$	\$
510- JW16x16:	1	EA	Wet Connections, 16" Dia. x 16" Dia.	\$	\$
510-KW:	13.5	TON	Ductile Iron Fittings	\$	\$
511S-A6:	17	EA	Valves, Gate Type, 6" Dia.	\$	\$
511S-A8:	34	EA	Valves, Gate Type, 8" Dia.	\$	\$
511S-A12:	6	EA	Valves, Gate Type, 12" Dia.	\$	\$
511S-A16:	11	EA	Valves, Gate Type, 16" Dia.	\$	\$
511S-B:	17	EA	Fire Hydrants (See Standard Detail No. 511-AW-02)	\$	\$
511S-C:	2	EA	Pressure or Flow Control Valve Assemblies (Complete-in-Place Per Plans)	\$	\$
511S-D:	1	EA	Drain Valve Assemblies (See Standard Detail No. 511-AW-03)	\$	\$

Bid Item	Bid Item Qty. Unit Item Description		Unit Price	Amount	
511S-F:	5	EA	Automatic Combination Air/Vacuum Release Valve Assembly, 2" Dia.	\$	\$
602S-B:	2800	SY	St. Augustine Block Sodding	\$	\$
605S-A:	4125	SY	Soil Retention Blanket Class I; Type A	\$	\$
609S-C:	14960	SY	Native Seeding	\$	\$
610S-A:	4990	LF	Protective Fencing Type A Chain Link fence (Typical Application-high damage potential)	\$	\$
610S-E:	27	EA	Tree Trunk Protection, Wood Planking	\$	\$
628S-B:	90	LF	Sediment Containment Dikes with Filter Fabric	\$	\$
642S:	8360	LF	Silt Fence for Erosion Control	\$	\$
648S:	135	LF	Mulch Sock	\$	\$
700S-TM:	1	LS	Total Mobilization Payment	\$	\$
701S-CD:	2	EA	Chain Link Vehicular Double Swing Gate, 6 Foot x 15 Foot (for Staging Area)	\$	\$
701S-T:	600	LF	Temporary Fence, 6-Foot-High, Chain Link Type (for Staging Area)	\$	\$
802S- BC.I.P.:	2	EA	C.I.P. Project Sign	\$	\$
863S-2:	85	EA	Reflectorized Pavement Markers (Type I-C)	\$	\$
863S-3:	280	EA	Reflectorized Pavement Markers (Type II-A-A)	\$	\$
863S-4:	17	EA	Reflectorized Pavement Markers (Type II-B-B)	\$	\$
863S-5:	10	EA	Reflectorized Pavement Markers (Type II-C-R)	\$	\$
871S- A8W:	300	LF	Reflectorized Type I Thermoplastic Pavement Markings 8 inches in width, 100 mils in thickness WHITE in color	\$	\$
871S- A12W:	50	LF	Reflectorized Type I Thermoplastic Pavement Markings 12 inches in width, 100 mils in thickness WHITE in color	\$	\$
871S- A24W:	160	LF	Reflectorized Type I Thermoplastic Pavement Markings 24 inches in width, 100 mils in thickness WHITE in color	\$	\$
871S- E4W:	3725	LF	Reflectorized Type II Paint Pavement Markings 4 inches in width, WHITE in color	\$	\$

Bid Item	Qty.	Unit	Item Description	Unit Price	Amount
871S-E4Y:	6335	LF	Reflectorized Type II Paint Pavement Markings 4 inches in width, YELLOW in color	\$	\$
871S-B:	1	EA	Reflectorized Type I Thermoplastic Pavement Markings, 6-12 inches in width, 100 mils in thickness, WHITE in color, ("ONLY" Word)	\$	\$
871S-C:	8	EA	Reflectorized Type I Thermoplastic Pavement Markings, 6-12 inches in width, 100 mils in thickness, WHITE in color, (Solid-Triangle, 3' wide base x 5' height "Speed Cushion Markings")	\$	\$
871S-D1:	1	EA	Reflectorized Type I Thermoplastic Pavement Markings, 6-12 inches in width, 100 mils in thickness, WHITE in color, ("Right Turn Lane" Symbol)	\$	\$
871S-D2:	8	EA	Reflectorized Type I Thermoplastic Pavement Markings, 6-12 inches in width, 100 mils in thickness, WHITE in color, ("Directional Arrow" Symbol)	\$	\$
871S-H:	75	EA	Reflectorized Type II Paint Pavement Markings, 6-12 inches in width, WHITE in color, (Solid-Triangle, 1' wide base x 1.5' height "Yield" Symbol)	\$	\$
874S-A:	690	LF	Eliminating Existing Pavement Markings: 4 inches in width, (Yellow)	\$	\$
SP510- AW2HDPE- P:	1105	LF	Pipe, 2" Dia. HDPE DR9 Class 200 Type (all depths), including Excavation and CLSM Backfill per Special Detail SD-3 (Water Service Tubing – Paved Area)	\$	\$
SP510- AW6PVC- P:	220	LF	Pipe, 6" Dia. PVC C900 DR14 Type (all depths), including Excavation and CLSM Backfill per Special Detail SD-3 (Paved Area)	\$	\$
SP510- AW8PVC- P:	7400	LF	Pipe, 8" Dia. PVC C900 DR14 Type (all depths), including Excavation and CLSM Backfill per Special Detail SD-3 (Paved Area)	\$	\$
SP510- AW12PVC- P:	170	LF	Pipe, 12" Dia. PVC C900 DR14 Type (all depths), including Excavation and CLSM Backfill per Special Detail SD-3 (Paved Area)	\$	\$

Bid Item	Qty.	Unit	Item Description	Unit Price	Amount
SP510- AW16PVC- P:	1865	LF	Pipe, 16" Dia. PVC C900 DR14 Type (all depths), including Excavation and <b>CLSM</b> Backfill per Special Detail SD-3 ( <b>Paved Area</b> )	\$	\$
SP510- AW3/4CU- UP:	45	LF	Pipe, 3/4" Dia. Copper K Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Private Lateral Service Tubing – Unpaved Area)	\$	\$
SP510- AW1.5CU- UP:	110	LF	Pipe, 1.5" Dia. Copper K Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Pressure Monitoring Tubing – Unpaved Area)	\$	\$
SP510- AW2HDPE- UP:	305	LF	Pipe, 2" Dia. HDPE DR9 Class 200 Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Water Service Tubing – Unpaved Area)	\$	\$
SP510- AW6PVC- UP:	200	LF	Pipe, 6" Dia. PVC C900 DR14 Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Unpaved Area)	\$	\$
SP510- AW8PVC- UP:	285	LF	Pipe, 8" Dia. PVC C900 DR14 Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Unpaved Area)	\$	\$
SP510- AW12PVC- UP:	416	LF	Pipe, 12" Dia. PVC C900 DR14 Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Unpaved Area)	\$	\$
SP510- AW16PVC- UP:	2090	LF	Pipe, 16" Dia. PVC C900 DR14 Type (all depths), including Excavation and Backfill per Standard Detail 510S-5 (Unpaved Area)	\$	\$
SP510-LW:	18	EA	Cut/Plug Existing Water Line (All Depths and Sizes), including Excavation and Backfill, Complete-in-Place	\$	\$
SP510- MW:	1	EA	Connecting to Existing Service Saddle, including Excavation and Backfill, Complete-in-Place (for Pressure Monitoring)	\$	\$
SP510- NW:	2	EA	1.5" Service Saddle Installation, including Excavation and Backfill, Complete-in-Place (for Pressure Monitoring)	\$	\$

Bid Item	Bid Item Qty. Unit Item Description		Unit Price	Amount	
SP510- OW:	2	EA	Mid Span Restraint with Concrete Thrust Collar per Special Detail – Concrete Thrust Collar "SD-B", including Excavation and Backfill, Complete-in-Place (for Existing Water Line)	\$	\$
SP641S:	4	EA	Stabilized Construction Entrance, Complete-in-Place	\$	\$
SP803S- MO:	18	Per Month	Barricades, Signs, and Traffic Handling, Complete-in-Place	\$	\$
SP862S- 4TW:	40	LF	4" White Temporary Removable Pavement Markings	\$	\$
SP1617- PP31:	1	LS	Potable Water Pressure Point Station #31, Complete-in-Place	\$	\$
SP1901-1:	2	EA	Mobilization for Licensed Asbestos Abatement Crew, including notification to state, per project, Complete-in-Place	\$	\$
SP1901-2:	2	WD	Asbestos Pipe Removal, Handling, Bagging, Labeling, Transportation, Disposal by Licensed Asbestos Abatement Personnel, and Compensation for Reduced Production by Pipe Laying Crew, Complete-in-Place	\$	\$
SS0884-A:	8	EA	Speed Cushions, Asphalt, Type A - 10' long x 6.5' wide, Complete-in-Place	\$	\$
SS1025- W:	17	EA	Private Lateral Relocation, including Excavation and Backfill, Complete-in-Place	\$	\$
SS2450-A:	1	LS	Horizontal Directional Drilling and Installation of 20-inch Dia. DR9 HDPE Pipe at US 290 Frontage Road	\$	\$
SS2450-B:	1	LS	Horizontal Directional Drilling and Installation of 12-inch Dia. DR9 HDPE Pipe at Springdale Road	\$	\$
SS2450-C:	1	LS	Horizontal Directional Drilling and Installation of 20-inch Dia. DR9 HDPE Pipe at Springdale Road	\$	\$

BASE BID	\$
(Words)	(Figures)
Base Bid includes Trench Excavation Safety Systems & Special Shoring	

• The "Base Bid" amount must be used in the MBE/WBE Compliance Plan Summary Page to determine subcontractor participation levels for the established MBE/WBE procurement goals.

• The "Base Bid" amount becomes the Bidder's "TOTAL BID" if allowances and/or alternates are not included.

#### **ALLOWANCE:**

Allowance No. 1:	Additional Water Line Scope	\$250,000		
SUBTOTAL ALLOV	\$250,000			
		_		
BASE BID PLUS		\$		
ALLOWANCE:				
		1		
TOTAL BID		\$		
Includes Base Bid plus Subtotal Allowance				

In the event of a mathematical error, the correct product, determined by using the "Unit Price" and "Quantity", and the correct sum, determined by totaling the correct line item Amounts, will prevail over the amount entered by the Bidder. The unit prices shown above will be the unit prices used to tabulate the Bid and used in the Contract, if awarded by the City.

#### Notes:

- 1. For a more detailed explanation of Bid allowances, see Section 01020.
- 2. MINIMUM WAGES: Workers on Project shall be paid not less than wage rates, including fringe benefits, as published by the Department of Labor (DOL) for Building Construction and Heavy and Highway Trades "AS APPLICABLE" and/or the minimum Wage required by City of Austin Ordinance No. 20160324-015, whichever is higher. The Total Minimum Wage required can be met using any combination of cash and non-cash qualified fringe benefits provided the cash component meets or exceeds the minimum wage required.

Optional Information on Bid Prices Submitted by Computer Printout: In lieu of handwritten unit prices in figures in ink on the Bid forms above, Bidders, at their option, may submit an original computer printout sheet bearing certification by, and signature for, the Bidding firm. The unit prices shown on acceptable printouts will be the unit prices used to tabulate the Bid and used in the Contract if awarded by the City. As a minimum, computer printouts must contain all information and, in the format, shown on the attached page: "Example of Bid Prices Submitted by Computer Printout" form.

If a computer printout is used, the Bidder must still execute that portion of the unit price Bid form which acknowledges the Bid Guaranty, Time of Completion, Liquidated Damages, and all addenda that may have been issued.

Bids with unit prices by computer printout may be rejected, if:

- 1. The computer printout does not include the required certification, set forth in the attached "Example".
- 2. The computer printout is not signed in the name of the firm to whom the Project Manual was issued.
- 3. The computer printout is non-responsive or otherwise omits required Bid items or includes items not shown on the Bid forms in the Project Manual.
- 4. The other required Bid documents issued by the City are not fully executed as provided above.
- 5. The signed Section 00300U is not returned with the signed computer printout.

If the Bid submitted by the Bidder contains both the form furnished by the City, completed according to the instructions, and also a computer printout, completed according to the instructions, unit prices of only one will be considered. In this situation, the unit Bid prices shown on the computer printout will be used to determine the Bid.

**BID GUARANTY:** A Bid guaranty must be enclosed with this Bid, as required in Section 00020, in the amount of not less than five percent (5%) of the total Bid. Following the Bid opening, submitted Bids may not be withdrawn for a period of ninety (90) Calendar Days. Award of Contract will occur within this period, unless mutually agreed between the parties. The Bid guaranty may become the property of the OWNER, or the OWNER may pursue any other action allowed by law, if:

- Bidder withdraws a submitted Bid within the period stated above,
- Bidder fails to submit the required post Bid information within the period specified in Section 00020 or 00100, or any mutually agreed extension of that period; or,
- Bidder fails to execute the Contract and furnish the prescribed documentation (bonds, insurance, etc.) needed to complete execution of the Contract within five (5) Working Days after notice of award, or any mutually agreed extension of that period.

**GEOTECHNICAL BASELINE ACKNOWLEDGEMENT:** The undersigned Bidder certifies that the Bidder has read and understands the Geotechnical Baseline Report (GBR), the Geotechnical Data Report, the Reflection Survey Report, and all other geological and geotechnical information and data as provided in the Contract Documents, including all Addenda. The Bidder acknowledges and agrees that the GBR represents the contractual statement of the subsurface conditions reasonably anticipated to be encountered during construction. The GBR will be used to evaluate whether subsurface conditions differ materially from those indicated in the GBR.

**TIME OF COMPLETION:** The undersigned Bidder agrees to commence work on the date specified in the written "Notice to Proceed" to be issued by the OWNER and to **substantially** complete construction of the improvements, as required by the Project Manual, Drawings and Addenda for the Work within **five hundred forty (540) Calendar** Days.

If a Substantial Completion date has been specified, the Bidder further agrees to reach Final Completion within **thirty (30) Calendar** Days after Substantial Completion as required by the Project Manual, Drawings and Addenda for the work.

The Bidder further agrees that should the Bidder fail to **substantially** complete the Work within the number of days indicated in the Bid or as subsequently adjusted, Bidder shall pay the liquidated damages for each consecutive day thereafter as provided below; unless the OWNER elects to pursue any other action allowed by law.

**WAIVER OF ATTORNEY FEES:** In submitting the Bid, in consideration for the waiver of the Bidder's right to attorney's fees by the OWNER, the Bidder knowingly and intentionally agrees to and shall waive the right to attorney's fees under Section 271.153 of the Texas Local Government Code in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to any Contract awarded pursuant to this solicitation process.

**LIQUIDATED DAMAGES:** The Bidder understands and agrees that the timely completion of the described Work is of the essence. The Bidder and OWNER further agree that the OWNER's actual damages for delay caused by failure to timely complete the Project are difficult, if not impossible to measure. However, with respect to the additional administrative

and consultant costs to be incurred by OWNER, the reasonable estimate of such damages has been calculated and agreed to by OWNER and Bidder.

Therefore, the Bidder and the OWNER agree that for each and every **Calendar** Day the Work or any portion thereof, remains incomplete after the **Substantial Completion** date as established by the above paragraph, "Time of Completion", payment will be due to the Owner in the amount of **one thousand five hundred seventy (\$1570)** per **Calendar** Day as liquidated damages, not as a penalty, but for delay damages to the OWNER.

If both Substantial and Final Completion dates have been specified, the Bidder and the OWNER further agree that for each and every **Calendar** Day the Work or any portion thereof, remains incomplete after the Final Completion date as established by the above paragraph, "Time of Completion", payment will be due to the OWNER in the amount of **three hundred ten (\$310)** per **Calendar** Day as liquidated damages, not as a penalty, but for delay damages to the OWNER. Such amount shall be deducted by the OWNER from any Contract payment due.

In the event of a default or breach by the CONTRACTOR and demand is made upon the surety to complete the project, in accordance with the Contract Documents, the surety shall be liable for liquidated damages pursuant to the Contract Documents in the same manner as the CONTRACTOR would have been.

**MINOR INFORMALITY**: OWNER reserves the right to reject any or all Bids and to waive any minor informality in any Bid or solicitation procedure (a minor informality is one that does not affect the competitiveness of the Bids).

**ADDENDUM**: The undersigned acknowledges receipt of the following addenda:

Addendum No. 1 dated	Received	
Addendum No. 2 dated	Received	
Addendum No. 3 dated	Received	
Addendum No. 4 dated	Received	

**BID DOCUMENT EXECUTION AND ACKNOWLEDGEMENT:** The undersigned Bidder certifies that the Bidder has read and understands Section 00020 Invitation for Bids, Section 00100 Instructions to Bidders, and all other requirements applicable to the Bidding process provided in the Bid and Contract Documents.

BIDDER's CERTIFICATION OF NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING (Section 00440): The undersigned Bidder, by its signature, represents and certifies that it has read and can affirmatively swear and subscribe to the statements in Section 00440 Non-Collusion, Non-Conflict of Interest, and Anti-Lobbying Certification. If the Bidder cannot affirmatively swear and subscribe to any of the statements in Section 00440, Bidder represents and certifies that it has provided a detailed written explanation with its Bid on separate pages annexed hereto. The undersigned Bidder further certifies that it has not in any way directly or indirectly had communication restricted in the City Code Chapter 2-7, Article 6 (Anti-Lobbying and Procurement) during the No-Lobbying Period as defined in Chapter 2-7.

The undersigned Bidder certifies that it Provisions and <b>Bidder certifies</b>	RESIDENT PROVISIONS (Section 00475) has read Section 00475 Nonresident Bidder that Bidder is a resident or the write in the blank the state of which Bidder is a
resident).	
Bidder will initial the blank set forth below completed and enclosed the corresponding E	v to represent and certify that the Bidder has Bid Documents with the Bid.
MBE/WBE Compliance Document	
One copy of Total Bid Form if Bid is sul	omitted electronically via Austin Finance Online
Bid Guaranty	
solicitation documents contained here signing below, certifies that they have	ne respondent to fully comply with the ein. The Respondent, by submitting and received and read all sections of the entire ions, addenda and documents incorporated the terms therein.
Corporate Secretary, *if Bidder is a Corporation	Bidder
Email for Secretary	Authorized Signature/Print Name
(Seal)	Title
	Date
	Address
	Telephone Number / FAX Number
	Email for Person Signing Bid
	Email for Bidder's Primary Contact Person

## **EXAMPLE: BID PRICES SUBMITTED BY COMPUTER PRINTOUT**

Project Name	2:				
CIP ID #:					
IFB #:					
Bid Item #	Bid Item Description	Unit	Qty	Unit Bid Price	Total Amount
Proposal:			Ic	otal	
items and the using these un agrees that th correct produc	NAME) certifies that the unit p alternates contained in this pro nit prices and no other informa e total Bid amount shown will t, determined by using the "Uni e item Amounts, will prevail over	posal are the ation from the be read as it t Price" and	e unit prices his printout. ts total Bid. "Quantity", ar	intended and (YOUR FIRM In the event nd the correct	that its Bid will be tabulated 'S NAME) acknowledges and of a mathematical error, the
Signed:					
Title:			Date	::	

**END** 

## **TOTAL BID FORM**

Solicitation	6100 CLMC847
No.:	
Project:	Springdale/290 Water Line Improvements
Bidder:	
<b>Total Bid</b>	
Amount:	
(includes Base	
Bid plus any	
Allowances or	
Alternates	
shown in	
Section 00300)	

#### Notes:

- 1. This form will be displayed publicly in Austin Finance Online approximately one hour after the solicitation closes.
- 2. In the case of discrepancies between this form and Section 00300, Section 00300 takes precedence.

#### STATEMENT OF BIDDERS EXPERIENCE

Section 00400

Project Name:	Springdale/290 Water Line Improvements
Name of Bidder:	
Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

Bidder must complete all Attachments to Section 00400 clearly and comprehensively. If necessary, responses may be continued on separately attached sheets.

To be considered a responsive and responsible bidder, the apparent three (3) low Bidders must complete and submit within three (3) working days of notification of low bidder status Attachments A through I in accordance with Article 11, Section 00100. Contractor Performance Evaluations for previous work with the City will be included in the assessment of the Bidder's experience. Any information in Attachments A through I and in the Contractor's Performance Evaluations that indicates the Bidder or a "Subcontractor" is not responsible or that might negatively impact a Bidder's ability to complete the Work within the Contract Time and for the Contract Price may result in the Bid being rejected.

The Bidder is responsible for the accuracy and completeness of all of the information provided by the Bidder or a proposed Subcontractor in response to this Invitation for Bids.

#### **POST-BID SUBMITTALS**

ATTACHMENT A - BIDDER'S INFORMATION

ATTACHMENT B - EXPERIENCE REQUIREMENTS (GENERAL CONTRACTOR)

ATTACHMENT C - PROJECT MANAGER AND SUPERINTENDENT EXPERIENCE

ATTACHMENT D - EXPERIENCE REQUIREMENTS (SPECIFIC CONSTRUCTION OR TECHNICAL EXPERIENCE)

ATTACHMENT E - AVAILABLE EQUIPMENT

ATTACHMENT F - AVAILABLE WORKFORCE

ATTACHMENT G - CURRENT PROJECTS

ATTACHMENT H - COMPLETED PROJECTS

ATTACHMENT I - BIDDER'S AUTHENTICATION

## ATTACHMENT A BIDDER'S INFORMATION

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Solicitation Number: 6100 CLMC847

CIP ID Number:		6935.022	
A.	Name of Bidder:		
В.	Bidder's Permanent Address:		
C.	Bidder's Phone Number:		
D.	Number of years in business under current company name:		

(Note: Bidder must have been in existence for a minimum of one (1) year under its current company name. Changes in company name during the experience period are acceptable, if the continuity of the company can be demonstrated. Attach separate documentation, if applicable.)

If Bidder answers "Yes" for <u>any</u> of questions E through H, Bidder must attach separate sheets with a brief description or explanation of the answer and provide pertinent contact information (parties' names, addresses and telephone numbers).

E.	Has the Bidder ever defaulted on a contract?	☐ Yes	□ No
F.	Are there currently any pending judgements, claims, or lawsuits against the Bidder?	□ Yes	□ No
G.	Does Bidder currently have any pending claims, judgements or lawsuits against any prior client?	☐ Yes	□ No
н.	Is the Bidder or its principals involved in any bankruptcy or reorganization proceedings?	☐ Yes	□ No

## ATTACHMENT B EXPERIENCE REQUIREMENTS (GENERAL CONTRACTOR)

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

#### **GENERAL CONTRACTOR EXPERIENCE:**

Bidder must list and describe <u>Bidder's</u> (not proposed subcontractors') construction experience <u>as a general contractor</u> for a minimum of three (3) successfully completed projects of comparable size, scope and complexity to the Work described in the Contract Documents. Bidder should refer to the Section 01010 Summary of Work, subsection 1.2 Description of Work, to determine what is reasonably comparable. Decisions on "comparability" are at the complete discretion of the OWNER.

Bidder must have completed the projects within the past five (5) years.

**Attention Bidder:** Duplicate this form for each of the three (3) projects.

PROJECT NO				
Name of Project:				
Location:				
OWNER's Name and Address:				
OWNER's Contact Person (Print):				
Phone/Fax No.				
Initial Contract Price:		-		
Final Contract Price:				
Contract Start Date:				
(Date of Notice to Proceed)				
Contract Time:	Calendar Days:	Working Days:		
Contract Substantial Completion Date:				
Actual Substantial Completion Date:				
If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each:				
Project Description and why it is comparable to this Contract:				

### ATTACHMENT C PROJECT MANAGER & SUPERINTENDENT EXPERIENCE

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Name of Bidder:	
Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

Bidder must attach resumes for the Project Manager and Superintendent who will be assigned to this project. The resumes must demonstrate that these individuals have worked on at least three (3) similar, successfully completed projects in the capacity of <u>Project Manager or Superintendent</u>, or other responsible supervisory capacity, as applicable, during the last 10 years.

Project Manager (name): _	
Superintendent (name):	
Superintendent (name)	

**Note: Attach Resumes & Experience** 

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

### SPECIFIC CONSTRUCTION EXPERIENCE (GENERAL CONTRACTOR OR SUBCONTRACTOR PERFORMING THE WORK)

Bidder must provide the following project history information for each Construction Experience requirement listed below. OWNER may in its reasonable discretion deem the provided experience information insufficient and reject the Bid.

For each Construction Experience item listed below, list and describe the applicable Construction Experience for a minimum of three (3) successfully completed projects of comparable size, scope, and complexity to the Work described for this project. Comparability requirements may be spread among the three (3) projects per item submitted, e.g. One Project may demonstrate comparable size, another Project may demonstrate comparable scope, and another may demonstrate comparable complexity. Decisions on "comparability" are at the complete discretion of the OWNER.

The Work must have been performed within the past five (5) years.

Bidder must provide all requested information in a complete, clear, and accurate manner. If necessary, additional information may be provided on separate attached sheets. Failure to provide any requested information may cause the Bid to be rejected by OWNER as non-responsive.

If the Bidder proposes to fulfill any specific construction experience requirement with subcontracted resources, the applicable Subcontractor must be included in the Bidder's Original MBE/WBE Compliance Plan. Failure to include subcontractors on the MBE/WBE Compliance Plan may render your bid non-responsive.

#### **SPECIFIC CONSTRUCTION EXPERIENCE ITEMS REQUIRED:**

- ITEM 1. Furnish and/or installation of water lines
- ITEM 2. Furnish and/or installation of HDPE water lines
- ITEM 3. Furnish and/or installation of Remote Terminal Unit
- ITEM 4. Furnish and/or installation of HDPE water lines by Horizontal Directional Drilling (HDD) method

The Bidder shall complete and duplicate the following specific Construction Experience Form as required to provide the requested documentation for a minimum of three (3) successfully completed projects for each of the above specific Construction Experience requirements.

CONSTRUCTION EXPERIENCE DOCUMENTATION FORM			
EXPERIENCE ITEM NUMBER:			
Project Number:			
Does Bidder plan to self-perform this work?	☐ Yes	□ No	
If "NO", provide the following Subcontra	ctor's information	on:	
Company's Address:			
Permanent Address:			
Phone No.			
# of years Subcontractor has been in business under current company name:			
Name of Project:			
Location:			
OWNER's Name:			
OWNER's Address:			
OWNER's Contact Person (Print):			
Phone/Fax No.:			
Initial Contract Price:			
Final Contract Price:			
Contract Start Date:			
(Date of Notice to Proceed)			
Contract Time:	Calendar Days:	Working Days:	
Contract Substantial Completion Date:			
Actual Substantial Completion Date:			
If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each:			
Project Description and why it is comparable to this Contract:			

# ATTACHMENT E AVAILABLE EQUIPMENT LIST

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Name of Bidder:	
Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

Provide a list of equipment that is available to the CONTRACTOR or its Subcontractor(s) and is specifically intended to be used on the Work under this Contract. Also indicate whether the equipment is owned or will be leased by the CONTRACTOR and/or Subcontractor(s).

EQUIPMENT	OWNED OR LEASED	COMMITTED TO ANOTHER PROJECT? (Yes / No)	AVAILABLE / RELEASE DATE

Use additional pages, as necessary

## ATTACHMENT F AVAILABLE WORKFORCE

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Name of Bidder:	
Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

Provide a list of the available workforce for the various disciplines and crafts required for the Work on this Project, including the number of work crews, and number and worker classification for each equipment operator, mechanic, and laborer for that portion of the Work that Bidder will actually perform.

Numb	er o	f Anti	icipated	Work Crews:	

DISCIPLINE OR CRAFT	NO. OF EMPLOYEES	COMMITTED TO ANOTHER PROJECT? (Yes / No)	AVAILABLE / RELEASE DATE
Professional (specify)			
Superintendent			
Technical (specify)			
Skilled Workers (specify)			
Semiskilled Workers (specify)			
Equipment Operators (list)			
Other			

Use additional pages, as necessary

# ATTACHMENT G CURRENT PROJECT LISTING (INCLUDING ALL CITY OF AUSTIN PROJECTS)

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Name of Bidder:				
Solicitation Number:	6100 CLMC847			
CIP ID Number:	6935.022			
	obs that Bidder ement regardin	r is currently commi g the job type; esti	Austin projects. Includitted to or has currentlimated project duration	
Name of Project:				
Location:				
Type of Job:				
City of Austin Job?		☐ Yes	□ No	
Project Start Date			<u> </u>	
<b>Estimated Completion</b>	Date:			
Project Contact:				
Brief Description:				
		1		
Name of Project:				
Location:				
Type of Job:				
City of Austin Job?		☐ Yes	□ No	
<b>Project Start Date</b>				
<b>Estimated Completion</b>	Date:			
Project Contact:				

**Brief Description:** 

# ATTACHMENT H COMPLETED PROJECTS (INCLUDING ALL CITY OF AUSTIN PROJECTS)

**Attention Bidder:** Complete and return within three (3) days of notification of the three (3) low bidders' status.

Name of Bidder:				
<b>Solicitation Number:</b>	6100 CLMC847			
CIP ID Number:	6935.022			
Bidder has completed company if less than	in the p	past five (5) years by years). Include the fol	City of Austin projects that calendar year (or life of lowing: a brief statement stion, project contact, and	
Calendar Year of				
Name of Project:				
Location:				
Type of Job:				
City of Austin Job?		☐ Yes	□ No	
Project Duration:				
Project Contact:				
Brief Description:				
Name of Project:				
Location:				
Type of Job:				
City of Austin Job?		☐ Yes	□ No	
Project Duration:			,	
Project Contact:				
Brief Description:				

Use additional pages as necessary to achieve a representative listing covering 5 years

## ATTACHMENT I BIDDERS AUTHENTICATION

(Attention Bidder: Complete and return within three (3) days of notification of the three (3) low bidders' status)

Solicitation Number:	6100 CLMC847
CIP ID Number:	6935.022

THE STATE OF TEXAS COUNTY OF TRAVIS

I certify that my responses and the information provided in Attachments A-H are true and correct to the best of my personal knowledge and belief and that I have made no willful misrepresentations in this Section, nor have I withheld any relevant information in my statements and answers to questions. I am aware that any information given by me in this Section may be investigated and I hereby give my full permission for any such investigation and I fully acknowledge that any misrepresentations or omissions in my responses and information may cause my bid to be rejected.

Company's Name
Signature, Authorized Representative of Bidder
Title
Date
FND

**Bidder's full name and entity status:** 

### **CERTIFICATE OF NON-SUSPENSION OR DEBARMENT**

Section 00405

Solicitation Number:	(to be filled in by Contractor)
parties that are suspended or deba Federal, State, or City of Austin contracts for goods or services equatransactions. This certification is re-	rom contracting with or making prime or sub-awards to arred or whose principals are suspended or debarred from a Contracts. Covered transactions include procurement ual to or in excess of \$25,000.00 and all non-procurement equired for all bidders on all City of Austin Contracts to be or in excess of \$25,000.00 and all non-procurement
	ies that its firm and its principals are not currently ng on any Federal, State, or City of Austin Contracts.
Contractor's full name and enti	ty status:
(Name/Signature of Authorized Of	ficial)
Title	
Title	
Date	
END	

### STATEMENT OF BIDDER'S SAFETY EXPERIENCE

Section 00410

# BIDDER'S SAFETY EXPERIENCE (To Be Submitted Post-Bid)

Solicitation Number:	(to be	e filled in by Co	ntractor)
NAME OF BIDDER:			
Pursuant to Section 252.0435 of the Local of safety records of bidders prior to awarding a to provide information to demonstrate the safety record, and will not automatic for this or any future procurement. The OV 00410 document separately when making disqualify a bidder, and may also consider the by the bidder's responses in making the detection.	City contract. Up afety and health rom other source cally be used to early be used to early a discretionary e cumulative impermination. Bidde	oon request, a keep performance of the used exclude the bidder the response of the informact of the informac	oidder is required of their company. to determine the ler from selection es to this Section of whether to mation generated
Upon notification from the OWNER, the three the following information:  WORKERS' COMPENSATION EXPERIENCE			
Provide bidder's Workers' Compensation	LE MODIFICAT	ION RATE DA	IA
Experience Modification Rate (EMR)		Policy Year	EMR
Data using the loss experience that	Current EMR:	roney rear	Liviic
occurred within the past five years.	1 Year Ago:		
	2 Years Ago:		
Attach bidder's NCCI workers	3 Years Ago:		
compensation experience rating sheets for the past five (5) years.	4 Years Ago:		
Bidder's initialing here certifies that bidder does not have an EMR:  (Submit a copy of bidder's Insurance Loss Run Reports for the last five years if bidder does not have an EMR.)  Bidder may include additional information explaining any circumstances that may have affected the company's EMR rate.  Evaluation: Bidders with a 5-year EMR average that exceeds the 5-year industry			
average EMR by more than 25% may b			year muusu y

### REGULATORY NOTICE AND CITATION HISTORY DATA

Provide bidder's information regarding regulatory OSHA and/or Environmental Protection Agency Notices and Citations as follows:

Describe federal, state, city/municipal or county OSHA notices of noncompliance or citations issued to or received by the bidder within the past three years or any notices from any environmental protection agency, including any notices or citations from any state agency or local government responsible for enforcing environmental protection or other health and safety laws or regulations of any state of the United States, received within the past three years.

Provide a description of each on the OSHA/EPA form on the following page to include:

- Date of Citation/Notices
- Issuing agency
- Standard cited
- Level of violation (i.e. serious, willful)
- Dates and brief description(s) of the event(s)
- Brief description(s) of actions taken to correct the violation(s)
- Current status (Open, Closed, Contested)
- If Closed, date of Closure
- If Open, estimated date of Closure

Bidder may include additional information explaining any related circumstand	ces
--	-----

Evaluation: Information may be verified by referring to respective agency. More than two serious or more than one willful or repeated violation (investigation completed) within the past three years may deem the Bidder non-responsive.

OSHA and/or Environmental Protection Agency Notices Within Past Three Years			rs			
Date of Citation or Notice	Issuing Agency	Violation Level (i.e. serious, willful)	Brief description of event	Brief description of actions taken to correct violation(s)	Current Status (Open, Closed, Contested)	Closed Date, or if Open, estimated Close Date

INJURY AND ILLNESS INCIDENCE RATE I	DATA	
Provide bidder's *Total Case Incidence	TCIR Rates:	
Rate(s) (TCIR) for the 3 most recent		
calendar years.	Current Rate:	
,	1 Year Ago:	
Attach bidder's OSHA 300 and 300A logs	2 Years Ago:	
for the past 3 years.		
in the part of year or		
DAYS AWAY, RESTRICTED, AND TRANSFE	ER RATE DATA	
Provide bidder's **Days Away,	DART Rates:	
Restricted, and Transfer Rate(s)		
(DART) for the three most recent calendar	Current Rate:	
years.	1 Year Ago:	
years.	2 Years Ago:	
Bidder may include additional information explaining any circumstances that may have affected the submitted rates and/or their associated three year trends.		
Evaluation: Rates will be compared to the most recently published Bureau of Labor Statistics (BLS) national average for the Standard Industrial Classification code (SIC) or North American Industrial Classification Systems (NAICS) code for the construction industry. For consideration of another code within the construction industry, the Bidder must provide the code and justification. Bidders with a 3-year TCIR or DART average that exceeds the 3-year TCIR or DART industry average may be deemed non-responsive.		

<sup>\*</sup>TCIR – To calculate the calendar year TCIR, determine the total number of all recordable injuries and illnesses that occurred during the year in question, divide that total by the total number of hours worked by all employees during that year, and multiply the result by 200,000.

<sup>\*\*</sup> DART – To calculate the calendar year DART, determine the total number of recordable injuries and illnesses resulting in days away from work, restricted work activity, and/or job transfer that occurred during the year in question, divide that total by the total number of hours worked by all employees during that year, and multiply the result by 200,000.

#### **ACKNOWLEDGEMENT**

THE STATE OF TEXAS
COUNTY OF TRAVIS

I certify that my responses and the information I have provided are true and correct to the best of my personal knowledge and belief and I have made no willful misrepresentations in this, or withheld any relevant information in my statements. I am aware that any information given by me in response to this Section 00410 may be investigated and I hereby give my full permission for any such investigations, and I fully acknowledge that any misrepresentations or omissions in my responses and information may cause my bid to be rejected or cause any contract based on misrepresentations to be cancelled.

Contractor's full name and entity status:	
(Name/Signature of Authorized Official)	
(Name/ Signature of Authorized Official)	
<u></u>	
Title	
Data	
Date	
END	

### NON-COLLUSION, NON-CONFLICT OF INTEREST AND ANTI-LOBBYING

# State of Texas County of Travis

The term **"Bidder"**, as used herein, includes the individual or business entity submitting the bid includes the directors, officers, partners, managers, members, principals, owners, agents, representatives, employees, other parties in interest of the Bidder, and anyone or any entity acting for or on behalf of the Bidder, including a subcontractor in connection with this bid.

The terms "City" and "Owner" are synonymous.

- 1. **Anti-Collusion Statement.** The Bidder has not and will not in any way directly or indirectly:
  - a. colluded, conspired, or agreed with any other person, firm, corporation, bidder or potential bidder to the amount of this bid or the terms or conditions of this bid.
  - b. paid or agreed to pay any other person, firm, corporation bidder or potential bidder any money or anything of value in return for assistance in procuring or attempting to procure a contract or in return for establishing the prices in the attached bid or the bid of any other bidder.
- 2. Preparation of Invitation for Bid and Contract Documents. The Bidder has not received any compensation or a promise of compensation for participating in the preparation or development of the underlying bid or contract documents., In addition, the Bidder has not otherwise participated in the preparation or development of the underlying bid or contract documents, except to the extent of any comments or questions and responses in the bidding process, which are available to all bidders, so as to have an unfair advantage over other bidders, provided that the Bidder may have provided relevant product or process information to a consultant in the normal course of its business.
- 3. **Participation in Decision Making Process.** The Bidder has not participated in the evaluation of bids or proposals or other decision making process for this solicitation, and, if Bidder is awarded a contract hereunder, no individual, agent, representative, consultant or sub contractor or consultant associated with Bidder, who may have been involved in the evaluation or other decision making process for this solicitation, will have any direct or indirect financial interest in the Contract, provided that the Bidder may have provided relevant product or process information to a consultant in the normal course of its business.
- 4. Present Knowledge. Bidder is not presently aware of any potential or actual conflicts of interest regarding this solicitation, which either enabled Bidder to obtain an advantage over other bidders or would prevent Bidder from advancing the best interests of OWNER in the course of the performance of the Contract.

- 5. **City Code.** As provided in Sections 2-7-61 through 2-7-65 of the City Code, no individual with a substantial interest in Bidder is a City official or employee or is related to any City official or employee within the first or second degree of consanguinity or affinity.
- 6. **Chapter 176 Conflict of Interest Disclosure.** In accordance with Chapter 176 of the Texas Local Government Code, the Bidder:
  - a. does not have an employment or other business relationship with any local government officer of OWNER or a family member of that officer that results in the officer of family member receiving taxable income;
  - b. has not given a local government officer of OWNER one or more gifts, other than gifts of food lodging transportation or entertainment accepted as a guest, that have an aggregate value of more than \$100 in the twelve-month period preceding the date the officer becomes aware of the execution of the Contract or that OWNER is considering doing business with the Bidder; and
  - c. does not have a family relationship with a local government officer of OWNER in the third degree of consanguinity or the second degree of affinity.

As required by Chapter 176, Bidder must file the Conflicts of Interest Questionnaire with the Purchasing Department no later than the seventh business day after the commencement of contract discussions or negotiations with the City or the submission of a Bid, response to a request for proposals, or other writing related to a potential contract with OWNER. The questionnaire must be updated not later than the seventh day after the date of an event that would make a statement in the questionnaire inaccurate or incomplete. There are statutory penalties for failure to comply with Chapter 176.

7. **Anti-Lobbying Ordinance.** On June 14, 2018, the Austin City Council adopted Ordinance No. 20180614-056 replacing Chapter 2.7, Article 6 of the City Code relating to Anti-Lobbying and Procurement. The policy defined in this Code applies to Solicitations for goods and/or services requiring City Council approval under City Charter Article VII, Section 15 (Purchase Procedures). The City requires Offerors submitting Offers on this Solicitation to certify that the Offeror has not in any way directly or indirectly had communication restricted in the ordinance section 2-7-104 during the No-Lobbying Period as defined in the Ordinance. The text of the City Ordinance is included in Section 00100 of this solicitation and is also posted on the Internet at:

https://assets.austintexas.gov/purchase/downloads/New ALO Ordinance No 20180614 -056.pdf

8. **Texas Government Code Chapter 2270.** The City is prohibited from contracting with any "company", for goods and services unless the following verification is included in this contract.

If CONTRACTOR qualifies as a "company", then CONTRACTOR verifies that it: (a) does not "boycott Israel"; and (b) will not "boycott Israel" during the term of this contract. For the purposes of this Section only, the terms "company" and "boycott Israel" have the meaning assigned by Texas Government Code Section 2270.001. CONTRACTOR's obligations under this Section, if any exist, will automatically cease or be reduced to the extent that the requirements of Texas Government Code Chapter 2270 are subsequently repealed, reduced, or declared unenforceable or invalid in whole or in part by any court or tribunal of competent jurisdiction or by the Texas Attorney General, without any further impact on the validity or continuity of this contract.

NOTE: THE ABOVE STATE LAW HAS RECENTLY BEEN TEMPORARILY ENJOINED. HOWEVER, IF THIS INJUNCTION IS LIFTED OR STAYED BY A COURT OR OTHER ENTITY OF COMPETENT JURISDICTION, THIS SECTION WILL BE AN ENFORCEABLE AND REQUIRED TERM OF YOUR CONTRACT WITH THE CITY. IF YOU DISAGREE WITH THE ABOVE PROVISION OF THE CONTRACT, PLEASE STRIKE THROUGH IT OR INDICATE YOUR OBJECTION ON THIS PAGE. YOUR BID WILL NOT BE AFFECTED BY STRIKING THROUGH THIS PROVISION AT THIS TIME. STRIKING THROUGH THE PROVISION OR STATING YOUR OBJECTION TO IT WILL NOT CAUSE THE CITY TO REJECT YOUR BID.

If the Bidder cannot affirmatively swear and subscribe to the forgoing statements, the Bidder shall provide a detailed written explanation on separate pages to be included with Bid.

### **NONRESIDENT BIDDER PROVISIONS**

Section 00475

Solicit	ation Number:		(to be filled in by Contractor	r)
		following questions in accoment Code § 2252.002, a	ordance with Vernon's Texas Sta s amended:	itutes and
A.	Is the bidder that resident bidder"?	t is making and submittir	ng this bid a "resident bidder" o	or a "non-
	Answer:			
(1)	includes a Contra		rincipal place of business is in Tent company or majority owne	
(2)	Nonresident Bidde	er - A bidder who is not a	Texas Resident Bidder.	
В.	Bidder's principal Bidder of that st Resident Bidder of	place of business is loca cate to bid a certain am	loes the state, in which the No sted, have a law requiring a No sount or percentage under the the nonresident bidder of that st	nresident bid of a
	Answer: ☐ Yes	☐ No Which state? _		
Reside	nt Bidder bid und		at amount or percentage must ident Bidder of that state in or	
	Answer:			

### STATE OF TEXAS COUNTY OF TRAVIS

(Figures)	(Words)
\$	
•	d approved by OWNER, and OWNER agrees to pay the
	the Project Manual, Drawings and Addenda, which are and made a part hereof and which have been prepared by
	performances, payments and agreements set forth herein ommence and complete the following Project:
State of, hereinafter ref	erred to as the "CONTRACTOR."
and,	thorized designee, hereinafter referred to as the "OWNER," of the City of, County of, and
municipal corporation, organized	and existing under laws of State of Texas, acting through
THIS AGREEMENT is made and a	entered into by and between the City of Austin, Texas, a

The CONTRACTOR hereby agrees to commence work on the date specified in the written "Notice to Proceed" to be issued by the OWNER and to <substantially> <finally> complete construction of the improvements, as required by the Project Manual, Drawings and Addenda for the Work within \_\_\_\_\_\_ (\_\_\_) <Working> <Calendar> Days. <If a Substantial Completion date has been specified, the CONTRACTOR further agrees to reach Final Completion within <\_\_\_\_\_> (<\_\_\_>) <Working> <Calendar> Days after Substantial Completion as required by the Project Manual, Drawings and Addenda for the work.> Waiver of any breach of this Contract shall not constitute waiver of any subsequent breach.

In consideration of the award and execution of this Contract, and in consideration of the waiver of its right to attorney's fees by the OWNER, the CONTRACTOR knowingly and intentionally waives its right to attorney's fees under Section 271.153 of the Texas Local Government Code in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to this Contract.

OWNER agrees to pay CONTRACTOR from available funds for performance of the Contract in accordance with the Bid and the provisions of the Contract Documents, subject to additions and deductions, as provided therein.

The OWNER's payment obligations are payable only and solely from funds available for the purposes of this Agreement.

Although drafted by OWNER, this Agreement, in event of any disputes over its meaning or application, shall be interpreted fairly and reasonably, and neither more strongly for nor against either party.

This Agreement is executed to be effective upon the date of the last party to sign.

The undersigned, by their signature, represents that they are authorized to bind the Contractor to fully comply with the Contract. The Contractor, by signing below, acknowledge that they have read the entire contract and agree to be bound by the terms contained herein.

OWNER	§ CONTRACTOR
Ву:	§ <b>By:</b>
(Signature)	§ (Signature)
Date	§ Date
Title of Signatory	§ Printed Name of Signatory
	§ 
	§ Title of Signatory, Authorized Rep §
	§ ATTEST (as applicable)
	§ §
	<ul> <li>*Corporate Secretary of Corporate</li> <li>Bidder or Corporate General Partner</li> </ul>

### **PERFORMANCE BOND**

Section 00610

STATE OF TEXAS	Bond No
COUNTY OF	C.I.P. ID No
Project Name	
Know All Men By These Presents: That	of the City of
County of , and	t of the City of, d State of, as Principal, and
, a solvent	company authorized under laws of the State of Texas
to act as surety on bonds for principa	als, are held and firmly bound unto
(OWNER), in the penal sum of	U.S. Dollars (\$U.S.) for payment
	said Principal and Surety bind themselves and their
	cessors and assigns, jointly and severally, by these
presents:	
Conditions of this Bond are such that.	, whereas, Principal has entered into a certain written
contract with OWNER, dated the	day of,, which Agreement is
hereby referred to and made a part h	day of,, which Agreement is nereof as fully and to the same extent as if copied at
length herein.	
Now therefore the condition of this	obligation is such, that if said Principal shall faithfully
	all respects duly and faithfully observe and perform all
	nd agreements in and by said contract agreed and
	red and performed, and according to true intent and
	nexed, then this obligation shall be void; otherwise to
	OWNER notifies Principal and Surety the OWNER is
	ult, Surety agrees to meet with OWNER and Principal
,	t of such notice to discuss methods of performing the
Work of the Contract.	
Provided, however, that this bond is	executed pursuant to provisions of Chapter 2253,
	and all liabilities on this bond shall be determined in
	rticle to same extent as if it were copied at length
herein.	
Surety, for value received, stipulate	s and agrees that no change in Contract Time or
	ct its obligation on this bond, and it does hereby waive
notice of any such change in Contract	Time or Contract Amount.
To with any who wash said Drive in all and	Country have size and and applied this in atmospheric
	Surety have signed and sealed this instrument this
Principal	Surety
Fillicipal	Surety
By(Signature)	By(Signature)
(Signature)	(Signature)
Title	Title
Address	Address
Addiess	/ tudi C35

		_
	Telephone	Fax
	E-Mail Address	
Name and address of Resident Agen	t of Surety:	

Note: Bond shall be issued by a solvent Surety company authorized to do business in Texas, and shall meet any other requirements established by law or by OWNER pursuant to applicable law. A copy of surety agent's "Power of Attorney" must be attached hereto.

### **PAYMENT BOND**

Section 00620

STATE OF TEXAS	Bond No
COUNTY OF	C.I.P. ID No
Project Name:	
Know All Men By These Presents: Tha	t of the City of , and State of as Principal,
and, a solven Texas to act as surety on bonds for	t company authorized under laws of the State of or principals, are held and firmly bound unto
right to sue upon this bond in the pen Dollars (\$ U.S.) for pa	(OWNER), and all Subcontractors, workers, eir interests may appear, all of whom shall have hal sum of
contract with OWNER, dated the	nereas, Principal has entered into a certain written day of,, which Agreement is eof as fully and to the same extent as if copied at
truly pay all Subcontractors, workers, I them owing by said Principals for sub materials done and furnished for the con	on is such, that if the said Principal shall well and aborers, mechanics, and suppliers, all monies to contracts, work, labor, equipment, supplies and struction of improvement of said Agreement, then I and void; otherwise to remain in full force and
Texas Government Code as amended an	xecuted pursuant to provisions of Chapter 2253, d all liabilities on this bond shall be determined in le to same extent as if it were copied at length
	and agrees that no change in Contract Time or sobligation on this bond, and it does hereby waive ne or Contract Amount.
In witness whereof, said Principal and Sday of	urety have signed and sealed this instrument this
Principal	Surety
By(Signature)	By(Signature)
Title	Title

Address			
	Telephone	Fax	
	E-Mail Address _		
Name and address of Resident	Agent of Surety:		

Note: Bond shall be issued by a solvent Surety company authorized to do business in Texas and shall meet any other requirements established by law or by OWNER pursuant to applicable law. A copy of surety agent's "Power of Attorney" must be attached hereto.

### NON-DISCRIMINATION AND NON-RETALIATION CERTIFICATE

Section 00630

## City of Austin, Texas Equal Employment/Fair Housing Office

To: City of Austin, Texas, ("OWNER")

Our firm conforms to the Code of the City of Austin Section 5-4-2 as reiterated below:

Chapter 5-4. Discrimination in Employment by City Contractors.

**Sec. 4-2 Discriminatory Employment Practices Prohibited. (B)** As an Equal Employment Opportunity (EEO) employer, the Contractor will conduct its personnel activities in accordance with established federal, state and local EEO laws and regulations and agrees:

- (1) Not to engage in any discriminatory employment practice defined in this chapter.
- (2) To take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without discrimination being practiced against them as defined in this chapter. Such affirmative action shall include, but not be limited to: all aspects of employment, including hiring, placement, upgrading, transfer, demotion, recruitment, recruitment advertising; selection for training and apprenticeship, rates of pay or other forms of compensation, and layoff or termination.
- (3) To post in conspicuous places, available to employees and applicants for employment, notices to be provided by OWNER setting forth the provisions of this chapter.
- (4) To state in all solicitations or advertisements for employees placed by or on behalf of Contractor, that all qualified applicants will receive consideration for employment without regard to race, creed, color, religion, national origin, sexual orientation, gender identity, disability, veteran status, sex or age.
- (5) To obtain a written statement from any labor union or labor organization furnishing labor or service to Contractors in which said union or organization has agreed not to engage in any discriminatory employment practices as defined in this chapter and to take affirmative action to implement policies and provisions of this chapter.
- (6) To cooperate fully with OWNER's Equal Employment/Fair Housing Office in connection with any investigation or conciliation effort of said Equal Employment/Fair Housing Office to ensure that the purpose of the provisions against discriminatory employment practices are being carried out.
- (7) To require compliance with provisions of this chapter by all subcontractors having fifteen or more employees who hold any subcontract providing for expenditure of \$2,000.00 or more in connection with any contract with OWNER subject to the terms of this chapter.

For the purposes of this Bid and any resulting Contract, Contractor adopts the provisions of the City's Minimum Standard Nondiscrimination and Non-Retaliation Policy as set forth below.

### City of Austin Minimum Standard Non-Discrimination and Non-Retaliation in Employment Policy

As an Equal Employment Opportunity (EEO) employer, the Contractor will conduct its personnel activities in accordance with established federal, state and local EEO laws and regulations.

The Contractor will not discriminate against any applicant or employee based on race, creed, color, national origin, sex, age, religion, veteran status, gender identity, disability, or sexual orientation. This policy covers all aspects of employment, including hiring, placement, upgrading, transfer, demotion, recruitment, recruitment advertising, selection for training and apprenticeship, rates of pay or other forms of compensation, and layoff or termination.

The Contractor agrees to prohibit retaliation, discharge or otherwise discrimination against any employee or applicant for employment who has inquired about, discussed or disclosed their compensation.

Further, employees who experience discrimination, sexual harassment, or another form of harassment should immediately report it to their supervisor. If this is not a suitable avenue for addressing their complaint, employees are advised to contact another member of management or their human resources representative. No employee shall be discriminated against, harassed, intimidated, nor suffer any reprisal as a result of reporting a violation of this policy. Furthermore, any employee, supervisor, or manager who becomes aware of any such discrimination or harassment should immediately report it to executive management or the human resources office to ensure that such conduct does not continue.

Contractor agrees that to the extent of any inconsistency, omission, or conflict with its current non-discrimination and non- retaliation employment policy, the Contractor has expressly adopted the provisions of the City's Minimum Non-Discrimination Policy contained in Section 5-4-2 of the City Code as set forth above and the City's Non-Retaliation Policy, as the Contractor's Non-Discrimination and Non-Retaliation Policy or as an amendment to such Policy and such provisions are intended to not only supplement the Contractor's policy, but will also supersede the Contractor's policy to the extent of any conflict.

UPON CONTRACT AWARD, THE CONTRACTOR SHALL PROVIDE A COPY TO THE CITY OF THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIAITON POLICY ON COMPANY LETTERHEAD, WHICH CONFORMS IN FORM, SCOPE, AND CONTENT TO THE CITY'S MINIMUM NON-DISCRIMINATION AND NON-RETALIATION POLICY, AS SET FORTH HEREIN, **OR** THIS NON-DISCRIMINATION AND NON-RETALIATION POLICY, WHICH HAS BEEN ADOPTED BY THE CONTRACTOR FOR ALL PURPOSES (THE FORM OF WHICH HAS BEEN APPROVED BY THE CITY'S EQUAL EMPLOYMENT/FAIR HOUSING OFFICE), WILL BE CONSIDERED THE CONTRACTOR'S NON-DISCRIMINATION AND NON-RETALIATION POLICY WITHOUT THE REQUIREMENT OF A SEPARATE SUBMITTAL.

(http://austintexas.gov/page/bid-docs).

#### Sanctions:

Our firm understands that non-compliance with Chapter 5-4 may result in sanctions, including termination of the contract and suspension or debarment from participation in future City contracts until deemed compliant with the requirements of Chapter 5-4.

#### Term:

The Contractor agrees that this Section 00630 Non-Discrimination and Non-Retaliation Certificate or the Contractor's separate conforming policy, which the Contractor has executed and filed with the Owner, will remain in force and effect for one year from the date of filing. The Contractor further agrees that, in consideration of the receipt of continued Contract payments, the Contractor's Non-Discrimination Policy will automatically renew from year-to-year for the term of the underlying Contract.

### TITLE VI ASSURANCES APPENDIX A

Section 00631

Solicitation Number:			(to be filled in by Contractor)									
During	the	performance	of	this	contract,	the	contractor,	for	itself,	its	assignees	and

successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. <u>Compliance with Regulations</u>: The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, the Federal Highway Administration, as they may be amended from time to time, which are herein

incorporated by reference and made a part of this contract.

2. <u>Nondiscrimination</u>: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate either directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 C.F.R. part 21.

- 3. <u>Solicitations for Subcontracts, Including Procurements of Materials and Equipment</u>: In all solicitations, either by competitive bidding or negotiation made by the contract for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.
- 4. <u>Information and Reports</u>: The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its book, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor will so certify to the Recipient, or the Federal Highway Administration, as appropriate, and will set forth what efforts it has made to obtain the information.
- 5. <u>Sanctions for Noncompliance</u>: In the event of the contractor's noncompliance with the Nondiscrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
  - (a) withholding of payments to the contractor under the contract until the contractor complies, and or
  - (b) cancelling, terminating or suspending a contract, in whole or in part.
- 6. <u>Incorporation of Provisions</u>: The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, that if a

contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(Source: DOT 1050.2A, Updated DOT Standard Title VI Assurances and Non-Discrimination Provisions 10/22/2013. Must be inserted into every contract/agreement regardless of funding sources.)

Contractor's full name and entity statu	IS:	
(Name/Signature of Authorized Official)		
Title		
Date		

#### TITLE VI ASSURANCES APPENDIX E

Section 00632

Solicitation Number:	(to be filled in by Contractor)

During the performance of this contract, the contractor (hereinafter includes consultants), for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

### Pertinent Nondiscrimination Authorities:

- 1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 C.F.R. Part 21.
- 2. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C.§ 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- 3. Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- 4. Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 C.F.R. Part 27;
- 5. The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 U.S.C. § 4 71, Section 4 7123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- 7. The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, subrecipients and contractors, whether such programs or activities are Federally funded or not);
- 8. Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- 9. The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- 10. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- 11. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP).
- 12. To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- 13. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

(Source: DOT 1050.2A, Updated DOT Standard Title VI Assurances and Non-Discrimination Provisions 10/22/2013. Must be inserted into every contract/agreement regardless of funding sources.)

Contractor's full name and entity status:					
(Name/Signature of Authorized Official)					
Title					
Date					
END					

# Bidding Requirements, Contract Forms and Conditions of the Contract CERTIFICATE OF INSURANCE

Section 00650

This Certificate shall be completed by a licensed	insurance agent:
Name and Address of Agency:  ———————————————————————————————————	City of Austin Reference: Project Name: C.I.P. No.: Project Location:
//	Managing Dept.:
Name and Address of Insured:	Contract No.: Project Mgr.: Insurers Affording Coverages: Insurer A:
Phone:/	Insurer B:
Prime or Sub-Contractor?:	Insurer C:
Name of Prime Contractor, if different from Insured:	Insurer D:

NSR ₋TR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFE- CTIVE DATE (MM/DD/YYYY)	POLICY EXPIR- ATION DATE (MM/DD/YYYY)	LIMITS OF LIABILITY	
	Commercial General Liability Policy				Each Occurrence	\$
	As defined in the Policy, does the Policy provide:				General Aggregate	\$
	Yes No Completed C	perations/Pro	oducts	•	Completed Operations /Products Aggregate	\$
	☐ Yes ☐ No Contractual	Liability			Personal & Advertising Injury	\$
	☐ Yes ☐ No Explosion				Deductible or Self Insured Retention \$	
	☐ Yes ☐ No Collapse					
	☐ Yes ☐ No Underground	i				
	☐ Yes ☐ No Contractors/	Subcontracto	ors Work			
	☐ Yes ☐ No Aggregate Li	mits per Proj	ect Form CG 2503			
	☐ Yes ☐ No Additional Ir	sured Form -	- CG 2010 and CG	2037		
	☐ Yes ☐ No 30 Day Notic	e of Cancella	tion Form – CG 02	205		
	Yes No Waiver of Su	ıbrogation Fo	rm – CG 2404	_		
	Pollution/ Environmental		_	_	Occurrence	\$
	Impairment Policy				Aggregate	\$

### Certificate of Insurance / 00650

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFE- CTIVE DATE (MM/DD/YYYY)	POLICY EXPIR- ATION DATE (MM/DD/YYYY)	LIMITS OF LIA	ABILITY
	Auto Liability Policy As defined in the Policy, does				CSL	\$
	the Policy provide:				Bodily Injury (Per Accident)	\$
	Yes No Any Auto				Bodily Injury (Per Person)	\$
	Yes No All Owned Auto	os			Property Damage (Per Accident)	\$
	Yes No Non-Owned Au	ıtos				
	Yes No Hired Autos					
	Yes No Waiver of Subr	ogation – (	CA0444			
	Yes No 30 Day Notice	of Cancella	tion – CA0244			
	Yes No Additional Insu					
	☐ Yes ☐ No MCS 90					
	Excess Liability				Occurrence	\$
	☐ Umbrella Form					_
	☐ Excess Liability Follow Form				Aggregate	\$
	Workers Compensation and Employers Liability				☐ Statutory	
	As defined in the Policy, does the Policy provide:				Each Accident	\$
	Yes No Waiver of Subr	ogation – \	WC420304		Disease – Policy Limit	\$
	☐ Yes ☐ No 30 Day Notice	of Cancella	tion – WC420601		Disease – Each Employee	\$
	Is a Builders Risk or Installation Insurance Policy provided? ☐ Yes ☐ No					*
	☐ Yes ☐ No Is the City sho	wn as loss	payee/mortgagee?	>		
	Professional Liability As defined in the Policy, does the Policy provide:				Each Claim	\$
	☐ Yes ☐ No 30 Day Notice Retroactive Date:	of Cancella	tion		Deductible or Self Insured Retention	\$

# Bidding Requirements, Contract Forms and Conditions of the Contract TEXAS SALES AND USE TAX EXEMPTION CERTIFICATE

Section 00670

City of Austin, Texas P.O. Box 1088 Austin, Texas 78767

CONTRACTOR/PURCHASER	:	
Street Address:		
City, State, ZIP Code:		
PROJECT:		
Project Manager:		
FDU No.:		
CIP ID No.:		
Description of items to be p	ourchased or as described on the attached order o	r invoice:
the City of Austin realty, inc services required by or inte	se all labor, materials, supplies, and equipment to cluding easements, or completely consumed at the gral to the performance of the contract for the Proce with State Comptroller Rule 3.291.	e Project jobsite and
Contractor/Purchaser claims th	nis exemption for the following reason: This contract is	to be performed for the
City of Austin, a tax exempt en	ntity under the Texas Tax Code.	
comply with the provisions of the exemption certificate to the commanner other than that express	le for payment of sales and use taxes which may becon the Tax Code. I also understand that it is a criminal off- ontractor for taxable items that I know, at the time of pu ssed in this certificate and depending on the amount of demeanor to a felony of the second degree.	ense to give an urchase, will be used in a
City of Austin, Texas	Title	Date
ELAINE HART	DEPUTY CITY MANGER/CHIEF FINANCIAL OFFICER	January 11, 2019
CONTRACTOR/PURCHASER:		
By:		
	cannot be issued for the purchase, lease, or rental of a	
Numbers" or "Tax Exe	DES NOT REQUIRE A NUMBER TO BE VALID. Sales and Impt" Numbers do not exist. This certificate should be filleted certificate to the Comptroller of Public Accounts.	
End		

Rev. Date 01/11/19

## NON-USE OF ASBESTOS AFFIDAVIT (CONTRACTOR PRIOR TO CONSTRUCTION) Section 00680

### STATE OF TEXAS COUNTY OF TRAVIS

	undersigned authority, upon oath deposed and		he Affiant who, be	eing by me
am over the ag	e of 18 years and I I	nave never been con	victed of a crime	e. I am the
known as CONTRACTOR.				
'I am fully competent to make this affidavit. I have personal knowledge of the facts set forth below and they are all true and correct.				
CONTRACTOR a	TRACTOR has submitt nd anticipates being	awarded a contrac	t for the const	ruction of
Austin, Texas, he as OWNER, and "WHEREAS the	reinafter known as Proje "WHEREAS asbestos ir OWNER desires not t nto the construction of t	ect, for the City of Aust a dust form is a rec o have any asbestos	tin, Texas, hereina cognized health h s containing mate	ifter known azard, and erials used
4 TI CONTDA	OTOD ('			

- 1. The CONTRACTOR, any person, firm or organization representing or represented by the CONTRACTOR, or employed by the CONTRACTOR shall not cause or allow any material to be incorporated into the construction of the project, or allow any building material on the project site that is an asbestos containing material or any other material defined as containing asbestos by any laws, rules or regulations promulgated by the United States Government, the State of Texas or any governmental organization or agency operating under the authority of either of those entities.
- 2. Realizing that there might be some materials in which a satisfactory non-asbestos containing material could not be obtained, the Consultant has received prior approval from the OWNER before specifying any such asbestos containing material. Those approved materials are the only asbestos containing materials that are exempt from the above prohibition.
- **3.** The CONTRACTOR certifies and affirms their understanding that if any asbestos containing materials not approved by the City of Austin for inclusion into the Project, are determined, as a result of any inspection and sample analysis performed by an individual(s) and/or firm(s) certified and/or licensed to perform such inspection by the United States Government and/or the State of Texas, to have been incorporated into the construction of the Project, or brought onto the site of the Project, the OWNER shall look to the CONTRACTOR for reimbursement of any and all costs incurred in the removal and/or other abatement of said asbestos containing materials.
- **4.** CONTRACTOR further understands that OWNER shall also look to the CONTRACTOR for any and all damages to OWNER which result from the inability of the OWNER to use any portion or all of the Project due to the incorporation of asbestos containing materials that have not been approved by OWNER.

# **Bidding Requirements, Contract Forms and Conditions of the Contract**

	derstands that OWNER will pursue reimbursement of any said y said damages from the CONTRACTOR by any and every means wer.
•	Signature of Affiant:
STATE OF TEXAS COUNTY OF TRAVIS	
ON, 20_ duly sworn by me, subscribe therein are true and correct.	, personally appeared and been d to the foregoing affidavit and has stated that the facts stated
i	Notary Public, State of Texas
i	Printed Name of Notary
FAID	My Commission Expires:

**END** 

# NON-USE OF ASBESTOS AFFIDAVIT (CONTRACTOR AFTER CONSTRUCTION) Section 00681

STATE	OF	TEXA	S
COUNT	ΥO	F TR	AVIS

BEFORE ME, the undersigned authority, personally appeared the Affiant who, being by me first duly sworn, upon oath deposed and stated:
"My name is, hereinafter known as Affiant. "I am over the age of 18 years and I have never been convicted of a crime. I am the of hereinafter
known as CONTRACTOR.
"I am fully competent to make this affidavit. I have personal knowledge of the facts set forth below and they are all true and correct.
"WHEREAS CONTRACTOR was awarded a Contract for, and was the Prime CONTRACTOR for the construction of
1. The CONTRACTOR, any person, firm or organization representing or represented by the CONTRACTOR, or employed by the CONTRACTOR has not caused or allowed any material to be incorporated into the construction of the project, or allowed any building material on the project site that is an asbestos containing material or any other material defined as containing asbestos by any laws, rules or regulation promulgated by the United States Government, the State of Texas or any governmental organization or agency operating under the authority of either of those entities.
2. Realizing that there were some materials in which a satisfactory non-asbestos containing material could not be obtained, the Consultant received prior approval from the OWNER before specifying any such asbestos containing material. Those approved materials were the only asbestos containing materials incorporated into the construction of the Project and are listed below, with their locations:
3. The CONTRACTOR certifies and affirms their understanding that if any asbestos containing
3. The CONTRACTOR certifies and affirms their understanding that if any asbestos containing

**3.** The CONTRACTOR certifies and affirms their understanding that if any asbestos containing materials not approved by the City of Austin for inclusion into the Project, are determined, as a result of any inspection and sample analysis performed by an individual(s) and/or firm(s) certified and/or licensed to perform such inspection by the United States Government and/or the State of Texas, to have been incorporated into the construction of the Project, or brought onto the site of the Project, the OWNER shall look to the CONTRACTOR for reimbursement of any and all costs incurred in the removal and/or other abatement of said asbestos containing materials.

# Bidding Requirements, Contract Forms and Conditions of the Contract

- **4.** CONTRACTOR further understands that OWNER shall also look to the CONTRACTOR for any and all damages to OWNER which result from the inability of the OWNER to use any portion or all of the Project due to the incorporation of asbestos containing materials that have not been approved by OWNER.
- **5.** CONTRACTOR further understands that OWNER will pursue reimbursement of any said cost and compensation for any said damages from the CONTRACTOR by any and every means within OWNER's right and power.

	Signature of Affiant:
STATE OF TEXAS COUNTY OF TRAVIS	
	, personally appeared and beered to the foregoing affidavit and has stated that the facts stated
	Notary Public, State of Texas
	Printed Name of Notary  My Commission Expires:

**END** 

# Bidding Requirements, Contract Forms and Conditions of the Contract GENERAL CONDITIONS OF THE CONTRACT

Section 00700

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# ARTICLE 1 - DEFINITIONS

Whenever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

- **1.1** Addendum Written instruments issued by the Contract Awarding Authority which clarify, correct or change the bidding requirements or the Contract Documents prior to the Due Date. "Addenda" is the plural form of Addendum.
- **1.2 Agreement -** Prescribed form, Section 00500.
- **1.3 Alternative Dispute Resolution -** The process by which a disputed Claim may be settled if the OWNER and the CONTRACTOR cannot reach an agreement between themselves, as an alternative to litigation.
- **1.4 Bid** A complete, properly signed response to an Invitation for Bid that, if accepted, would bind the Bidder to perform the resultant Contract.
- **1.5 Bidder -** A person, firm, or entity that submits a Bid in response to a Solicitation. Any Bidder may be represented by an agent after submitting evidence demonstrating the agent's authority. The agent cannot certify as to his own agency status.
- **1.6 Bid Documents -** The advertisement or Invitation for Bids, instructions to Bidders, the Bid form, the Contract Documents and Addenda.
- **1.7 Calendar Day -** Any day of the week; no days being excepted. Work on Saturdays, Sundays, and/or Legal Holidays shall be coordinated with OWNER.
- 1.8 Change Directive A written directive to CONTRACTOR, signed by OWNER, ordering a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Amount or Contract Time, or both. A Change Directive may be used in the absence of total agreement on the terms of a Change Order. A Change Directive does not change the Contract Amount or Contract Time, but is evidence that the parties expect that the change directed or documented by a Change Directive will be incorporated in a subsequently issued Change Order.
- **1.9 Change Orders -** Written agreements entered into between CONTRACTOR and OWNER authorizing an addition, deletion, or revision to the Contract, issued on or after the Execution Date of the Agreement.
- **1.10 Claim -** A written demand seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract.
- **1.11 Contract** The binding legal agreement between the OWNER and the CONTRACTOR. The Contract represents the entire and integrated agreement between OWNER and CONTRACTOR for performance of the Work, as evidenced by the Contract Documents.
- **1.12 Contract Amount -** The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents.
- **1.13 Contract Awarding Authority -** A City department authorized to enter into Contracts on behalf of the City.
- **1.14 Contract Documents Project Manual, Drawings, Addenda and Change Orders.**
- **1.15 Contract Time -** The number of days allowed for completion of the Work as defined by the Contract. When any period is referred to in days, it will be computed to exclude the first and include the last day of such period. A day of twenty-four hours measured from midnight to the next midnight will constitute a day.

- **1.16 CONTRACTOR** The individual, firm, corporation, or other business entity with whom OWNER has entered into the Contract for performance of the Work.
- **1.17 Critical Path -** The longest series of tasks that runs consecutively from the beginning to the end of the project, as determined by duration and workflow sequence. This longest path sets the managerial standard for how quickly a project can be completed, given appropriate resources.
- **1.18 Drawings -** Those portions of the Contract Documents which are graphic representations of the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been approved by OWNER. Drawings may include plans, elevations, sections, details, schedules and diagrams. Shop Drawings are not Drawings as so defined.
- **1.19 Due Date -** The date and time specified for receipt of Bids.
- **1.20 Engineer/Architect (E/A) -** The OWNER's design professional identified as such in the Contract. The titles of "Architect/Engineer," "Architect" and "Engineer" used in the Contract Documents shall read the same as Engineer/Architect (E/A). Nothing contained in the Contract Documents shall create any contractual or agency relationship between E/A and CONTRACTOR.
- **1.21** Equal The terms "equal" or "approved equal" shall have the same meaning.
- **1.22 Execution Date -** Date of last signature of the parties to the Agreement.
- **1.23 Field Order -** A written order issued by Owner's Representative which orders minor changes in the Work and which does not involve a change in the Contract Amount or the Contract Time.
- **1.24 Final Completion -** The point in time when OWNER determines that all Work has been completed and final payment to CONTRACTOR will be made in accordance with the Contract Documents.
- **1.25** Force Account a basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in Section 11.5.
- **1.26 Inspector -** The authorized representative of any regulatory agency that has jurisdiction over any portion of the Work.
- **1.27 Invitation for Bid (IFB) -** a Solicitation requesting pricing for a specified Good or Service which has been advertised for Bid in a newspaper and/or the Internet.

#### 1.28 Legal Holidays

**1.28.1** The following are recognized by the OWNER:

HolidayDate ObservedNew Year's DayJanuary 1Martin Luther King, Jr.'s BirthdayThird Monday in JanuaryPresident's DayThird Monday in FebruaryMemorial DayLast Monday in MayJune 19June 19Independence DayJuly 4

Labor Day First Monday in September

Veteran's Dav November 11

Thanksgiving Day Fourth Thursday in November Friday after Thanksgiving Friday after Thanksgiving

Christmas Eve December 24
Christmas Day December 25

- **1.28.2** If a Legal Holiday falls on Saturday, it will be observed on the preceding Friday. If a Legal Holiday falls on Sunday, it will be observed on the following Monday.
- **1.28.3** Christmas Eve is observed only if it falls on a Monday through Thursday. If Christmas Eve falls on a Friday, that day is observed as the Christmas Day holiday.
- **1.29 Milestones -** A significant event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
- **1.30 Notice to Proceed -** A Written Notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.
- **1.31 OWNER -** City of Austin, Texas, a municipal corporation, home rule city and political subdivision organized and existing under the laws of the State of Texas, acting through the City Manager or his/her designee, officers, agents or employees to administer design and construction of the Project.
- **1.32 Owner's Representative -** The designated representative of the OWNER. The Owner's Representative will be identified at the pre-construction conference.
- **1.33 Partial Occupancy or Use -** Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work, provided OWNER and CONTRACTOR have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, utilities, corrective work, insurance and warranties.
- **1.34 Project -** The subject of the Work and its intended result.
- 1.35 Project Manual That portion of the Contract Documents which may include the following: introductory information; bidding requirements, Contract forms and General and Supplemental General Conditions; General Requirements; Specifications; Drawings; MBE/WBE or DBE Procurement Program Package; Project Safety Manual; and Addenda.
- **1.36 Resident Project Representative -** The authorized representative of E/A who may be assigned to the site or any part thereof.
- **1.37 Shop Drawings -** All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR as required by the Contract Documents.
- **1.38 Specifications -** Those portions of the Contract Documents consisting of written technical descriptions as applied to the Work, which set forth to CONTRACTOR, in detail, the requirements which must be met by all materials, equipment, construction systems, standards, workmanship, equipment and services in order to render a completed and useful project.
- **1.39 Solicitation -** Solicitation means, as applicable, an Invitation for Bid or a Request for Proposal.
- **1.40 Substantial Completion -** The stage in the progress of the Work when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so OWNER can occupy or utilize the Work for its intended use, as evidenced by a Certificate of Substantial Completion approved by OWNER.

- **1.41 Subcontractor -** An individual, firm, corporation, or other business entity having a direct contract with CONTRACTOR for the performance of a portion of the Work under the Contract.
- **1.42 Sub-Subcontractor -** A person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the work.
- **1.43 Superintendent -** The representative of CONTRACTOR authorized in writing to receive and fulfill instructions from the Owner's Representative, and who shall supervise and direct construction of the Work.
- **1.44 Supplemental General Conditions -** The part of the Contract Documents which amends or supplements the General Conditions. All General Conditions which are not so amended or supplemented remain in full force and effect.
- **Supplier -** An individual or entity having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.
- **1.46 Time Extension Request -** An approved request for time extension on a form acceptable to OWNER.
- **1.47 Work -** The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents.
- 1.48 Working Day Any day of the week, not including Saturdays, Sundays, or Legal Holidays in which conditions under the CONTRACTOR's control will permit work for a continuous period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m. If other contract documents reduce the continuous period available for work to less than seven (7) hours, those reduced hours shall be considered a Working Day. Upon agreement with Owner's Representative, work on Saturdays, Sundays, and/or Legal Holidays may be allowed and will be considered a Working Day.

#### 1.49 Working Hours

- 1.49.1 Working Day Contract: All Work shall be done between 7:00 a.m. and 6:00 p.m. unless otherwise authorized by Owner's Representative. However, emergency work may be done without prior permission as indicated in paragraph 6.11.5. If night Work is authorized and conditions under CONTRACTOR's control will permit Work for a continuous period of not less than seven (7) hours between 12:00 a.m. and 11:59 p.m. it will be considered a Working Day. Night Work may be revoked at any time by OWNER if CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night Work.
- **1.49.2 Calendar Day Contract:** All Work shall be done between 7:00 a.m. and 6:00 p.m. unless authorized by Owner's Representative. However, emergency work may be done without prior permission as indicated in paragraph 6.11.5. Night Work may be revoked at any time by OWNER if CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night Work.
- **1.50 Written Notice -** Written communication between OWNER and CONTRACTOR. Written Notice shall be deemed to have been duly served if delivered in person to Owner's Representative or CONTRACTOR's duly authorized representative, or if delivered at or sent by registered or certified mail to the attention of Owner's Representative or CONTRACTOR's duly authorized representative at the last business address known to the party giving notice.

#### ARTICLE 2 - PRELIMINARY MATTERS

- **2.1 Delivery of Agreement, Bonds, Insurance, etc.:** Within five (5) Working Days after written notification of award of Contract, CONTRACTOR shall deliver to OWNER signed Agreement, Bond(s), Insurance Certificate(s) and other documentation required for execution of Contract.
- **2.2 Copies of Documents:** OWNER shall furnish to CONTRACTOR (1) copy of the executed Project Manual, one (1) set of Drawings and one (1) copy of the Contract Documents in .pdf format. Additional copies will be furnished, upon request, at the cost specified in the Supplemental General Conditions."
- **2.3 Commencement of Contract Times; Notice to Proceed:** The Contract Time(s) will begin to run on the day indicated in the Notice to Proceed. Notice to Proceed will be given at any time within sixty (60) calendar days after the Execution Date of the Agreement, unless extended by written agreement of the parties.

# **2.4 Before Starting Construction:**

- 2.4.1 No Work shall be done at the site prior to the preconstruction conference without OWNER's approval. Before undertaking each part of the Work, CONTRACTOR shall carefully study the Contract Documents to check and verify pertinent figures shown thereon compare accurately to all applicable field measurements. CONTRACTOR shall promptly report in writing to Owner's Representative any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from Owner's Representative before proceeding with any Work affected thereby. CONTRACTOR shall be liable to OWNER for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents of which CONTRACTOR knew or reasonably should have known.
- 2.4.2 It is mutually agreed between CONTRACTOR and OWNER that successful completion of the Work within the Contract completion date is of primary importance. Therefore, the CONTRACTOR hereby agrees to submit to the Owner's Representative for review and approval, or acceptance, as appropriate, all information requested within this section, including a Baseline Schedule, no later than five working days prior to the preconstruction conference. The Owner's Representative will schedule the preconstruction conference upon the timely submittal of the required documents, unless time is extended by written mutual agreement. CONTRACTOR will submit the following:
  - A proposed Baseline Schedule developed using Microsoft Project software, unless otherwise approved by Owner's Representative ("Baseline Schedule") to confirm that all Work will be completed within the Contract time. The Baseline Schedule must (i) indicate the times (number of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents, (ii) identify the Critical Path for completing the Work, (iii) identify when all Subcontractors will be utilized, and (iv) take into consideration any limitations on Working Hours, including baseline Rain Days on Calendar Day Contracts, and (v) be prepared accordance with Section 01310, Schedules and Reports, if applicable; otherwise in accordance with Section 01300, Submittals. This Baseline Schedule, a copy of which shall be made available at the job site(s), must contain sufficient detail to indicate that the CONTRACTOR has properly identified required Work elements and tasks, has provided for a sufficient and proper workforce and integration of Subcontractors, has provided sufficient

- resources and has considered the proper sequencing of the Work required to result in a successful Project that can be completed within the Contract time;
- .2 An organizational chart showing the principals and management personnel who will be involved with the Work, including each one's responsibilities for the Work;
- .3 To the extent not set forth in the Section 00400 Statement of Contractor's Experience, a complete listing of the CONTRACTOR's employees proposed for the Work. List each one by name and job title, and show length of employment with CONTRACTOR;
- .4 To the extent not set forth in the Section 00410 Statement of Bidder's Safety Experience, a discussion and confirmation of the CONTRACTOR's commitment to safety by providing a copy of its employee's safety handbook and the safety records for the past three years of CONTRACTOR's proposed project manager and Superintendent;
- .5 A preliminary schedule of Shop Drawing and sample submittals;
- .6 A preliminary schedule of values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will be deemed to include an appropriate amount of overhead and profit applicable to each item of Work;
- .7 To the extent not set forth in the Section 00400 Statement of Contractor's Experience, a letter designating CONTRACTOR's Superintendent and project manager, and a confirmation of past project experience for the CONTRACTOR's Superintendent and project manager specifically intended for the Work;
- **.8** A letter from CONTRACTOR and Subcontractor(s) listing salaried specialists. A salaried specialist is anyone except an hourly worker whose wage rate is governed by Section 00830 of this agreement;
- .9 A letter designating the project's Safety Representative along with a copy of their Department of Labor-issued OSHA card proving completion of the OSHA 30-hour Construction Safety and Health training class in the OSHA Outreach Training Program;
- .10 If applicable, an excavation safety system plan;
- .11 If applicable, a plan illustrating proposed locations of temporary facilities;
- .12 A completed Non-Use of Asbestos Affidavit (Prior to Construction);
- **.13** A letter designating the Texas Registered Professional Land Surveyor for layout of the Work, if the Work requires the services of a surveyor; and
- .14 Copies of the Department of Labor-issued OSHA cards proving completion of the OSHA 10-hour Construction Safety and Health training class in the OSHA Outreach Training Program for each worker (defined as a person covered by a prevailing wage determination) that will initially be on site. Note that workers must possess other OSHA-required training as the work dictates in accordance with the OSHA Act; and specifically, the contractor must meet the required provisions in 509S Excavation Safety Systems required prior to commencing excavation;

- .15 A certificate of worker's compensation insurance coverage for all persons providing services on the Project (refer to 5.2.1.3 in Section 00700 for definition of persons providing services on the Project);
- .16 A Construction Equipment Emissions Reduction Plan.
- **2.4.3** Neither the acceptance nor the approval of any of the submittals required in paragraph 2.4.2, above, will constitute the adoption, affirmation, or direction of the CONTRACTOR'S means and methods.
- 2.5 Preconstruction Conference: Prior to commencement of Work at the site, CONTRACTOR must attend a preconstruction conference with Owner's Representative and others, as set forth in Division 1. Additionally, prior to commencement of work, the CONTRACTOR shall host a preconstruction conference for the Subcontractors identified on the originally approved compliance plan, Owner's Representative and others, as set forth in Division 1. The CONTRACTOR shall notify all Subcontractors five (5) working days prior to the preconstruction conference. If the CONTRACTOR has included Subcontractors in the initial preconstruction conference, the additional Subcontractor preconstruction conference will not be required.
- 2.6 Initially Acceptable Schedules: Unless otherwise provided in the Contract Documents, CONTRACTOR shall obtain approval of Owner's Representative on the Baseline Schedule submitted in accordance with paragraph 2.4.2.1 and Division 1 before the first progress payment will be made to CONTRACTOR. The Baseline Schedule must provide for an orderly progression of the designated portion of the Work to completion within any specified Milestones and Contract Times. Acceptance of the schedule by Owner's Representative will neither impose on Owner's Representative responsibility or liability for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility for such Work. CONTRACTOR's schedule of Shop Drawings and sample submissions must provide an acceptable basis for reviewing and processing the required submittals. CONTRACTOR's schedule of values must conform to the requirements set forth in Division 1.

#### ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

#### 3.1 Intent:

3.1.1 The intent of the Contract Documents is to include all information necessary for the proper execution and timely completion of the Work by CONTRACTOR. The CONTRACTOR will execute the Work described in and reasonably inferable from the Contract Documents as necessary to produce the results indicated by the Contract Documents. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In cases of disagreement, the following order of precedence shall generally govern (top item receiving priority of interpretation):

Signed Agreement
Addendum to the Contract Documents, including approved changes
Supplemental General Conditions
General Conditions
Other Bidding Requirements and Contract Forms
Special Provisions to the Standard Technical Specifications
Special Specifications
Standard Technical Specifications

Drawings (figured dimensions shall govern over scaled dimensions) Project Safety Manual (if applicable),

with the understanding that a common sense approach will be utilized as necessary so that the Contract Documents produce the intended response.

- **3.1.2** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.
- 3.2 Reporting and Resolving Discrepancies: If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provisions of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code or instructions of any Supplier, CONTRACTOR shall report it to Owner's Representative in writing at once, and CONTRACTOR shall not proceed with the Work affected thereby until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.3.1 or 3.3.2. CONTRACTOR shall be liable to OWNER for failure to report any such conflict, error, ambiguity or discrepancy of which CONTRACTOR knew or reasonably should have known.

# 3.3 Modifying and Supplementing Contract Documents:

- **3.3.1** The Contract Documents may be modified to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions by change order or contract amendment.
- **3.3.2** In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:
  - .1 Field Order.
  - **.2** Review of a Shop Drawing or sample.
  - **.3** Written interpretation or clarification.
- 3.4 Reuse of Documents Prohibited: CONTRACTOR and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of E/A or E/A's consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and E/A.
- 3.5 In the event of the breach by the OWNER or CONTRACTOR of any of its obligations under the Contract, so as to support a claim by the other party, the provisions of this Contract will be equitably construed to allow the resolution of such a claim and all of the other provisions of this Contract shall continue in full force and effect as to the rights, responsibilities, and remedies of the OWNER and CONTRACTOR.

# ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

**4.1 Availability of Lands:** The OWNER will provide access to all land and interests in land required for the Work and will notify CONTRACTOR of any restrictions in such access. CONTRACTOR may make a claim if OWNER fails to provide timely access to the Work.

CONTRACTOR must obtain any additional temporary construction facilities, stockpiling or storage sites not otherwise provided.

# 4.2 Subsurface and Physical Conditions:

- **4.2.1** CONTRACTOR specifically represents that it has carefully examined the plans, the geotechnical report, if any, and the site of the proposed Work and is thoroughly familiar with all of the conditions surrounding construction of the Project, having had the opportunity to conduct any and all additional inquiry, tests and investigation that he/she deems necessary and proper. CONTRACTOR acknowledges the receipt of the geotechnical report, if any, and agrees that the report, while it is an accurate record of the geotechnical conditions at the boring locations, is not a guarantee of specific site conditions which may vary between boring locations.
- 4.2.2 CONTRACTOR must notify OWNER in writing as soon as reasonably possible, but no later than three (3) calendar days, if unforeseen conditions are encountered at the site which are (i) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (ii) unknown physical conditions of an unusual nature, that differ materially from those normally encountered in the type of work being performed under this Contract. CONTRACTOR may not disturb the conditions until OWNER conducts an investigation. Owner's Representative and E/A will promptly investigate such conditions with E/A. If it is determined that such conditions differ materially and cause an increase or decrease in the CONTRACTOR's cost of or time required for performance of any part of the Work, Owner's Representative will recommend an equitable adjustment in the Contract Amount or Contract Time, or both. If it is determined that such conditions are not materially different from those indicated in the Contract Documents, Owner's Representative will notify CONTRACTOR in writing of such findings and the Contract will not be adjusted. CONTRACTOR may dispute such a determination in accordance with Article 16.
- 4.2.3 Notwithstanding any other provision of this Contract, CONTRACTOR is solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Work area. "Public utility lines" means the utility distribution and supply system, and "utility customer service lines" means the utility lines connecting customers to the utility distribution and collection system. Generally, existing utility customer service line connections are not shown on the Drawings. CONTRACTOR shall notify "One Call" and exercise due care to locate, mark, uncover and otherwise protect all such lines in the construction zone and any of CONTRACTOR's work or storage areas. CONTRACTOR's responsibility for the location and protection of utilities is primary and nondelegable. CONTRACTOR shall indemnify or reimburse such expenses or costs (including fines that may be levied against OWNER) that may result from unauthorized or accidental damage to all public lines and utility customer service lines in the work OWNER reserves the right to repair any damage CONTRACTOR causes to such utilities at CONTRACTOR's expense. If a public line and/or customer service line is damaged by CONTRACTOR, CONTRACTOR shall give verbal notice within one (1) hour and written notice within twentyfour (24) hours to the Owner's Representative.

- 4.2.4 CONTRACTOR shall take reasonable precaution to avoid disturbing primitive records and antiquities of archaeological, paleontological or historical significance. No objects of this nature shall be disturbed without written permission of OWNER and Texas Historical Commission. When such objects are uncovered unexpectedly, CONTRACTOR shall stop all Work in close proximity and notify Owner's Representative and Texas Historical Commission of their presence and shall not disturb them until written permission and permit to do so is granted. All primitive rights and antiquities uncovered on OWNER's property shall remain property of State of Texas, Texas Historical Commission conforming to Texas Natural Resources Code. If it is determined by OWNER, in consultation with Texas Historical Commission, that exploration or excavation of primitive records or antiquities on Project site is necessary to avoid loss, CONTRACTOR shall cooperate in salvage work attendant to preservation. If the Work stoppage or salvage work causes an increase in CONTRACTOR's cost of, or time required for, performance of the Work, the Contract Amount and/or Contract Time will be equitably adjusted.
- 4.3 Reference Points: Unless otherwise specified, all control lines and bench marks suitable for use in layout will be furnished by OWNER. Lay out of the Work shall be performed in accordance with Division 1. Controls, bench marks and property boundary markers shall be carefully preserved by CONTRACTOR by use of flags, staffs or other visible devices and in case of destruction or removal by CONTRACTOR or its employees, such controls and bench marks shall be replaced by a Registered Professional Land Surveyor at CONTRACTOR's expense. City of Austin survey monuments damaged by CONTRACTOR will be reestablished by OWNER at CONTRACTOR's expense.

#### 4.4 Hazardous Materials:

- 4.4.1 To the extent provided by applicable law, OWNER shall be responsible for any hazardous material uncovered or revealed at the site which was not shown, indicated or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. CONTRACTOR shall immediately notify Owner's Representative of any suspected hazardous materials encountered before or during performance of the Work and shall take all necessary precautions to avoid further disturbance of the materials.
- **4.4.2** CONTRACTOR shall be responsible for any hazardous materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.
- **4.4.3** No asbestos-containing materials shall be incorporated into the Work or brought on Project site without prior approval of OWNER. The CONTRACTOR shall not knowingly use, specify, request or approve for use any asbestos containing materials or lead-based paint without the OWNER'S written approval. When a specific product is specified, the CONTRACTOR shall endeavor to verify that the product does not include asbestos containing material.
- **4.4.4** Refer to Division 1 for hazardous material definitions and procedures.
  - Unless otherwise expressly provided in the Contract Documents to be part of the Work, CONTRACTOR is not responsible for any unexpected Hazardous Materials encountered at the site. Upon encountering any Hazardous Conditions, CONTRACTOR must stop Work immediately in the affected area and duly notify OWNER and, if required by applicable law or regulations, all government or quasi-government entities with jurisdiction over the Project or site.

- .2 Upon receiving notice of the presence of suspected Hazardous Materials, OWNER shall take the necessary measures required to ensure that the Hazardous Materials are remediated or rendered harmless. Such necessary measures shall include OWNER retaining qualified independent experts to (i) ascertain whether Hazardous Materials have actually been encountered, and, if they have been encountered, (ii) prescribe the remedial measures that OWNER must take either to remove the Hazardous Materials or render the Hazardous Materials harmless.
- CONTRACTOR shall be obligated to resume Work at the affected area of the Project only after OWNER's Representative provides written certification that (i) the Hazardous Materials have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all government and quasi-government entities having jurisdiction over the Project or site. The CONTRACTOR shall be responsible for continuing the Work in the unaffected portion of the Project and site.
- .4 CONTRACTOR will be entitled, in accordance with these General Conditions, to an adjustment in its Contract Amount and/or Contract Time(s) to the extent CONTRACTOR's cost and/or time of performance have been adversely impacted by the presence of Hazardous Materials.
- Notwithstanding the preceding provisions of this Section 4.1, OWNER is not responsible for Hazardous Materials introduced to the Site by CONTRACTOR, Subcontractors or anyone for whose acts they may be liable. CONTRACTOR shall indemnify, defend and hold harmless OWNER and OWNER's officers, directors, employees and agents from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from those hazardous materials introduced to the site by CONTRACTOR, Subcontractors or anyone for whose acts they may be liable.
- **4.4.5** CONTRACTOR shall be responsible for use, storage and remediation of any hazardous materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers or anyone else for whom CONTRACTOR is responsible.

# ARTICLE 5 - BONDS AND INSURANCE

5.1 Surety and Insurance Companies: All bonds and insurance required by the Contract Documents shall be obtained from solvent surety or insurance companies that are duly licensed by the State of Texas and authorized to issue bonds or insurance policies for the limits and coverages required by the Contract Documents. The bonds shall be in a form acceptable to OWNER and shall be issued by a surety which complies with the requirements of Texas Insurance Code, Title 12, Chapter 3503. The surety must obtain reinsurance for any portion of the risk that exceeds 10% of the surety's capital and surplus. For bonds exceeding \$100,000, the surety must also hold a certificate of authority from the U.S. Secretary of the Treasury or have obtained reinsurance for any liability in excess of \$1,000,000 from a reinsurer that is authorized as a reinsurer in Texas or holds a certificate of authority from the U.S. Secretary of the Treasury. In the event that the proposed surety for a contract award in excess of \$100,000 does not hold a certificate of authority from the

U.S. Secretary of the Treasury and/or its proposed reinsurer does not hold a certificate of authority from the U.S. Secretary of the Treasury, the OWNER may require additional financial solvency information from the Bidder/Contractor and the proposed surety company and/or reinsurer as part of the 00400 Statement of Bidders Experience and determination of bidder responsibility in the award of the Contract.

#### **5.2** Workers' Compensation Insurance Coverage:

#### **5.2.1** Definitions:

- .1 Certificate of coverage ("certificate") A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (DWC-81, DCW-82, DCW-83, or DCW84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.
- Duration of the Project includes the time from the beginning of the Work on the Project until the CONTRACTOR's/ person's Work on the Project has been completed and accepted by OWNER.
- Code, Section 406.096) includes all persons or entities performing all or part of the services the CONTRACTOR has undertaken to perform on the Project, regardless of whether that person contracted directly with the CONTRACTOR and regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.
- **5.2.2** CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the CONTRACTOR providing services on the Project, for the duration of the Project.
- **5.2.3** CONTRACTOR must provide a certificate of coverage to OWNER prior to being awarded the Contract.
- **5.2.4** If the coverage period shown on the CONTRACTOR's current certificate of coverage ends during the duration of the Project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with OWNER showing that coverage has been extended.
- **5.2.5** CONTRACTOR shall obtain from each person providing services on the Project, and provide to OWNER:
  - .1 A certificate of coverage, prior to that person beginning Work on the Project, so OWNER will have on file certificates of coverage showing coverage for all persons providing services on the Project; and
  - No later than seven (7) days after receipt by CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

- **5.2.6** CONTRACTOR shall retain all required certificates of coverage for the duration of the Project and for one (1) year thereafter.
- **5.2.7** CONTRACTOR shall notify OWNER in writing by certified mail or personal delivery, within ten (10) days after CONTRACTOR knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
- **5.2.8** CONTRACTOR shall post on each Project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
- **5.2.9** CONTRACTOR shall contractually require each person with whom it contracts to provide services on a Project, to:
  - .1 Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;
  - .2 Provide to CONTRACTOR, prior to that person beginning Work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;
  - .3 Provide CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;
  - .4 Obtain from each other person with whom it contracts, and provide to CONTRACTOR: a) a certificate of coverage, prior to the other person beginning Work on the Project; and b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;
  - **.5** Retain all required certificates of coverage on file for the duration of the Project and for one (1) year thereafter;
  - .6 Notify OWNER in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and
  - .7 Contractually require each person with whom it contracts, to perform as required by paragraphs 5.2.9.1 5.2.9.7, with the certificates of coverage to be provided to the person for whom they are providing services.
- **5.2.10** By signing this Contract or providing or causing to be provided a certificate of coverage, CONTRACTOR is representing to OWNER that all employees of the CONTRACTOR who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Texas Worker's Compensation Commission's Division of Self- Insurance Regulation. Providing false or misleading information

- may subject CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.
- **5.2.11** CONTRACTOR's failure to comply with any of these provisions is a breach of Contract by CONTRACTOR which entitles OWNER to declare the Contract void if CONTRACTOR does not remedy the breach within ten (10) days after receipt of notice of breach from OWNER.
- **5.3 Other Bond and Insurance Requirements:** For additional insurance requirements, refer to the Supplemental General Conditions.

#### 5.4 Bonds:

#### **5.4.1** General.

- .1 Bonds, when required, shall be executed on forms furnished by or acceptable to OWNER. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- .2 If the surety on any bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Texas or it ceases to meet the requirements of the preceding paragraph, CONTRACTOR shall within ten (10) days thereafter substitute another bond and surety, both of which must be acceptable to OWNER.
- .3 When Performance Bonds and/or Payment Bonds are required, each shall be issued in an amount of one hundred percent (100%) of the Contract Amount as security for the faithful performance and/or payment of all CONTRACTOR's obligations under the Contract Documents. Performance Bonds and Payment Bonds shall be issued by a solvent surety company authorized to do business in the State of Texas, and shall meet any other requirements established by law or by OWNER pursuant to applicable law. Any surety duly authorized to do business in Texas may write Performance and Payment Bonds on a project without reinsurance to the limit of ten percent (10%) of its capital and surplus. Such a surety must reinsure any obligations over ten percent (10%).

#### **5.4.2** Performance Bond.

- .1 If the Contract Amount exceeds \$100,000, CONTRACTOR shall furnish OWNER with a Performance Bond in the form set out in Section 00610.
- .2 If the Contract Amount exceeds \$25,000 but is less than or equal to \$100,000, CONTRACTOR shall furnish OWNER with a Performance Bond in the form set out in Section 00610, unless the original Contract Time is 60 Calendar Days/40 Working Days or less, in which case CONTRACTOR can agree to the following terms and conditions for payment in lieu of providing a Performance Bond: no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER; CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the one (1) year warranty period.
- .3 If the Contract Amount is less than or equal to \$25,000, CONTRACTOR will not be required to furnish a Performance Bond; provided that no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER under the following terms and conditions: CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the one (1) year warranty period.

.4 If a Performance Bond is required to be furnished, it shall extend for the one (1) year warranty period.

### **5.4.3** Payment Bond.

- .1 If the Contract Amount exceeds \$50,000, CONTRACTOR shall furnish OWNER with a Payment Bond in the form set out in Section 00620.
- •2 If the Contract Amount is less than or equal to \$50,000, CONTRACTOR will not be required to furnish a Payment Bond; provided that no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER under the terms and conditions specified in paragraph 5.4.2.3.
- **5.4.4 Maintenance Bond:** If the Contract Documents contemplate a period of maintenance beyond the one (1) year contractual warranty period, OWNER agrees that any bond to be required for such maintenance work will be in the amount of the maintenance work during any extended maintenance period.

# ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

### **6.1** Supervision and Superintendence:

- **6.1.1** CONTRACTOR shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.
- 6.1.2 CONTRACTOR shall have a competent, qualified Superintendent on the Work at all times that work is in progress. To be qualified, at a minimum, the Superintendent must be effective at (a) communicating both verbally and in writing with the OWNER's representative; (b) receiving and fulfilling instructions from the Owner's Representative; (c) supervising and directing the construction of the Work; (d) reading and interpreting the plans and specifications; (e) writing, preparing and submitting necessary paperwork; and (f) understanding work sequencing and scheduling. The Superintendent will be CONTRACTOR's representative on the Work and shall have the authority to act on the behalf of CONTRACTOR. All communications given to the Superintendent shall be as binding as if given to CONTRACTOR. Either CONTRACTOR or the Superintendent shall provide a cellular telephone number and an emergency and home telephone number at which one or the other may be reached if necessary when work is not in progress. Superintendent must be an employee of the CONTRACTOR, unless such requirement is waived in writing by the Owner's Representative. If the CONTRACTOR proposes a management structure with a Project Manager supervising, directing, and managing construction of the work in addition to or in substitution of a Superintendent, the requirements of these Construction Documents with respect to the Superintendent shall likewise apply to any such Project Manager.
  - .1 CONTRACTOR shall present the resume of the proposed Superintendent to the Owner's Representative showing evidence of experience and successful superintendence and direction of work of a similar scale and complexity. If, in the opinion of the Owner's Representative, the proposed Superintendent does

- not indicate sufficient experience in line with the Work, he/she will not be allowed to be the designated Superintendent for the Work.
- .2 The Superintendent shall not be replaced without Written Notice to Owner's Representative. If CONTRACTOR deems it necessary to replace the Superintendent, CONTRACTOR shall provide the necessary information for approval, as stated above, on the proposed new Superintendent.
- .3 A qualified substitute Superintendent may be designated in the event that the designated Superintendent is temporarily away from the Work, but not to exceed a time limit acceptable to the Owner's Representative. CONTRACTOR shall replace the Superintendent upon OWNER's request in the event the Superintendent is unable to perform to OWNER's satisfaction.

# 6.2 Labor, Materials and Equipment:

- 6.2.1 CONTRACTOR shall maintain a work force adequate to accomplish the Work within the Contract Time. CONTRACTOR agrees to employ only orderly and competent workers, skillful in performance of the type of Work required under this Contract. CONTRACTOR, Subcontractors, Sub-subcontractors, and their employees may not use or possess any alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on OWNER's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs, on the job. Subject to the applicable provisions of Texas law, CONTRACTOR, Subcontractors, Sub-subcontractors, and their employees may not use or possess any firearms or other weapons while on the job or on OWNER'S property. If OWNER or Owner's Representative notifies CONTRACTOR that any worker or representative of Contractor is incompetent, disorderly, abusive, or disobedient, has knowingly or repeatedly violated safety regulations, has possessed any firearms in contravention of the applicable provisions of Texas law, or has possessed or was under the influence of alcohol or drugs on the job, CONTRACTOR shall immediately remove such worker or representative, including an officer or owner of CONTRACTOR, from performing Contract Work, and may not employ such worker or representative again on Contract Work without OWNER's prior written consent. CONTRACTOR shall at all times maintain good discipline and order on or off the site in all matters pertaining to the Project. Workers on Project shall be paid not less than wage rates, including fringe benefits, as published by the Department of Labor (DOL) for Building Construction and Heavy and Highway Trades "AS APPLICABLE" and/or the minimum wage required by City of Austin Ordinance No. 20160324-015, whichever is higher. The Total Minimum Wage required can be met using any combination of cash and non-cash qualified fringe benefits provided the cash component meets or exceeds the minimum wage required.
- **6.2.2** Unless otherwise specified in Division 1, CONTRACTOR shall provide and pay for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.
- 6.2.3 All materials and equipment shall be of good quality and new (including new products made of recycled materials, pursuant to Section 361.426 of the Texas Health & Safety Code), except as otherwise provided in the Contract Documents. If required by Owner's Representative, CONTRACTOR shall furnish satisfactory evidence (reports of required tests, manufacturer's certificates of compliance with material requirements, mill reports, etc.) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected,

erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

# **6.2.4** Substitutes and "Approved Equal" Items:

- .1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains words reading that no like, equivalent or "approved equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be submitted by CONTRACTOR, at CONTRACTOR'S sole risk, including disruptions to the Critical Path of the Progress Schedule, to E/A through Owner's Representative under the following circumstances:
  - .1.1 "Approved Equal": If in E/A's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by E/A as an "approved equal" item, in which case review of the proposed item may, in E/A's sole discretion, be accomplished without compliance with some or all of the requirements for evaluation of proposed substitute items. CONTRACTOR shall provide E/A with the documentation required for E/A to make its determination.
  - .1.2 Substitute Items: If in E/A's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "approved equal" item under subparagraph 6.2.4.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided in Division 1 to allow E/A to determine that the item of material or equipment proposed is essentially equivalent to that named and a substitute therefor.
- Substitute Construction Methods and Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may, at CONTRACTOR'S sole risk, including disruptions to the Critical Path of the Progress Schedule, with prior approval of E/A furnish or utilize a substitute means, method, technique, sequence, or procedure of construction. CONTRACTOR shall submit sufficient information to Owner's Representative to allow E/A, in E/A's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by E/A will be same as that provided for substitute items in Division 1.
- E/A's Evaluation: E/A will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to subparagraphs 6.2.4.1.1 and 6.2.4.1.2. E/A will be the sole judge of acceptability. No "approved equal" or substitute shall be ordered, installed, or utilized until E/A's review is complete, which will be evidenced by either a Change Order or completion of the Shop Drawing review procedure. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety bond with respect to any "approved equal" or substitute or for any other delay or disruption to the Critical Path of the Project Schedule attributable to any such substitution. OWNER shall not be responsible for any delay due to review time for any "approved equal" or substitute.

- **.4** CONTRACTOR's Expense: All data and documentation to be provided by CONTRACTOR in support of any proposed "approved equal" or substitute item will be at CONTRACTOR's expense.
- .5 The approval of the E/A will not relieve the CONTRACTOR from primary responsibility and liability for the suitability and performance of any proposed substitute item, method or procedure and will not relieve CONTRACTOR from its primary responsibility and liability for curing defective Work and performing warranty work, which the CONTRACTOR shall cure and perform, regardless of any claim the CONTRACTOR may choose to advance against the E/A or manufacturer.
- **6.2.5** CONTRACTOR agrees to assign to OWNER any rights it may have to bring antitrust suits against its Suppliers for overcharges on materials incorporated in the Project growing out of illegal price fixing agreements. CONTRACTOR further agrees to cooperate with OWNER should OWNER wish to prosecute suits against Suppliers for illegal price fixing.
- **6.3 Progress Schedule:** Unless otherwise provided in Division 1, CONTRACTOR shall adhere to the Baseline Schedule established in accordance with paragraph 2.6 as it may be adjusted from time to time as provided below:
  - 6.3.1 CONTRACTOR shall submit to Owner's Representative for review and approval any proposed adjustments in the Progress Schedule that will not change the Contract Times or Milestones on a monthly basis. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. CONTRACTOR's Progress Schedule must show how the CONTRACTOR will consistently advance the progress of the Work in accordance with the Critical Path of the Work and the Contract Time or Milestones. Such adjustments will conform generally to the Progress Schedule then in effect and additionally will comply with any provisions of Division 1 applicable thereto.
  - **6.3.2** Proposed adjustments in the Progress Schedule that will change the Contract Times or Milestones shall be submitted in accordance with the requirements of Article 12. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. Such adjustments may only be made by a Change Order or Time Extension Request in accordance with Article 12.

# 6.4 Concerning Subcontractors, Suppliers and Others:

- **6.4.1** Assignment: CONTRACTOR agrees to retain direct control of and give direct attention to the fulfillment of this Contract. CONTRACTOR agrees not to, by Power of Attorney, or otherwise, assign said Contract without the prior written consent of OWNER. In addition, without OWNER'S written consent, the CONTRACTOR will not subcontract the performance of the entire Work or the supervision and direction of the Work.
- 6.4.2 Award of Subcontracts for Portions of the Work: CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization, whether initially or as a substitute, against whom OWNER may have reasonable objection. OWNER will communicate such objections by Written Notice. If OWNER requires a change without good cause of any Subcontractor, person or organization previously accepted by OWNER, the Contract Amount shall be increased or decreased by the difference in the cost occasioned by any such change, and appropriate Change Order shall be issued. CONTRACTOR shall not substitute any Subcontractor, person or

organization that has been accepted by OWNER, unless the substitute has been accepted in writing by OWNER. No acceptance by OWNER of any Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER to reject defective Work.

- 6.4.3 CONTRACTOR shall enter into written agreements with all Subcontractors and Suppliers which specifically binds the Subcontractors or Suppliers to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and E/A. The OWNER reserves the right to specify that certain requirements shall be adhered to by all Subcontractors and Sub-subcontractors as indicated in other portions of the Contract Documents and these requirements shall be made a part of the agreement between CONTRACTOR and Subcontractor or Supplier. Subject to and in accordance with the above requirements, the CONTRACTOR must provide and will be deemed for all purposes to have provided in its contracts with major Subcontractors or Suppliers on the Project (those contracts of more than \$10,000) the following specific provision: alternative dispute resolution (paragraphs 16.2 and 16.3), which shall be mandatory in the event of a subcontractor or supplier claim and a prerequisite for the submission of any derivative claim. The CONTRACTOR's standard subcontract form is subject to the OWNER's review and approval. The OWNER may request and the CONTRACTOR will provide within five (5) working days a copy of any subcontract requested by the OWNER.
- 6.4.4 CONTRACTOR shall be fully responsible to OWNER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or E/A to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by laws and regulations.
- 6.4.5 CONTRACTOR shall be solely responsible for efficiently scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR in order to avoid any delays or inefficiencies in the prosecution of the Work. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with Owner's Representative through CONTRACTOR.
- **6.4.6** The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing or delineating the Work to be performed by any specific trade.
- 6.4.7 CONTRACTOR shall pay each Subcontractor and Supplier their appropriate share of payments made to CONTRACTOR not later than ten (10) Calendar Days of CONTRACTOR's receipt of payment from OWNER. Upon request from Owner, the CONTRACTOR has two (2) Working Days to provide documentation verifying Payment to Subcontractor(s). The CONTRACTOR is required to notify the Subcontractor(s) in writing of rejection of Application for Payment within two (2) Working Days following notification by Owner. Failure of CONTRACTOR to make payments to Subcontractors or for labor, materials or equipment in accordance to this contract, may be cause to reject future Bids by the CONTRACTOR in accordance

- with Section 00100 9.B.4 and may be cause to reject payment in accordance with 00700 14.4.1.3.
- **6.4.8** To the extent allowed by Texas law, the OWNER shall be deemed to be a third party beneficiary to each subcontract and may, if OWNER elects, following a termination of the CONTRACTOR, require that the Subcontractor(s) perform all or a portion of unperformed duties and obligations under its subcontract(s) for the benefit of the OWNER, rather than the CONTRACTOR; however, if the OWNER requires any such performance by a Subcontractor for the OWNER's direct benefit, then the OWNER shall be bound and obligated to pay such Subcontractor the reasonable value for all Work performed by such Subcontractor to the date of the termination of the CONTRACTOR, less previous payments, and for all Work performed thereafter. In the event that the OWNER elects to invoke its right under this section, OWNER will provide notice of such election to the CONTRACTOR and the affected Subcontractor(s).

# 6.5 Patent Fees and Royalties:

- **6.5.1** CONTRACTOR shall be responsible at all times for compliance with applicable patents or copyrights encompassing, in whole or in part, any design, device, material, or process utilized, directly or indirectly, in the performance of the Work or the formulation or presentation of its Bid.
- **6.5.2** CONTRACTOR shall pay all royalties and license fees and shall provide, prior to commencement of Work hereunder and at all times during the performance of same, for lawful use of any design, device, material or process covered by letters, patent or copyright by suitable legal agreement with the patentee, copyright holder, or their duly authorized representative whether or not a particular design, device, material, or process is specified by OWNER.
- 6.5.3 CONTRACTOR shall defend all suits or claims for infringement of any patent or copyright and shall save OWNER harmless from any loss or liability, direct or indirect, arising with respect to CONTRACTOR's process in the formulation of its Bid or the performance of the Work or otherwise arising in connection therewith. OWNER reserves the right to provide its own defense to any suit or claim of infringement of any patent or copyright in which event CONTRACTOR shall indemnify and save harmless OWNER from all costs and expenses of such defense as well as satisfaction of all judgments entered against OWNER.
- **6.5.4** OWNER shall have the right to stop the Work and/or terminate this Agreement at any time in the event CONTRACTOR fails to disclose to OWNER that CONTRACTOR's work methodology includes the use of any infringing design, device, material or process.
- **6.6 Permits, Fees:** Unless otherwise provided in the Supplemental General Conditions, CONTRACTOR shall obtain and pay for all construction permits, licenses and fees required for prosecution of the Work.

### 6.7 Laws and Regulations:

**6.7.1** CONTRACTOR shall give all notices and comply with all laws and regulations applicable to furnishing and performing the Work, including arranging for and

obtaining any required inspections, tests, approvals or certifications from any public body having jurisdiction over the Work or any part thereof. Except where otherwise expressly required by applicable laws and regulations, neither OWNER nor E/A shall be responsible for monitoring CONTRACTOR's compliance with any laws and regulations.

- **6.7.2** Maintaining clean water, air and earth or improving thereon shall be regarded as of prime importance. CONTRACTOR shall plan and execute its operations in compliance with all applicable Federal, State and local laws and regulations concerning control and abatement of water pollution and prevention and control of air pollution.
- **6.7.3** If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to laws or regulations, CONTRACTOR shall bear all claims, costs, losses and damages arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with laws and regulations, but this does not relieve CONTRACTOR of CONTRACTOR's obligations under Article 3.

#### 6.8 Taxes:

- **6.8.1** CONTRACTOR shall pay only those sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the State of Texas in the performance of this public works contract.
- **6.8.2** OWNER is an exempt organization as defined by Chapter 11 of the Property Tax Code of Texas and is thereby exempt from payment of Sales Tax under Chapter 151, Limited Use Sales, Excise and Use Tax, Texas Tax Code, and Article 1066 (C), Local Sales and Use Tax Act, Revised Civil Statutes of Texas.

#### 6.9 Use of Premises:

6.9.1 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by laws and regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of or in connection with the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall indemnify, defend and hold harmless OWNER, E/A, E/A'S Consultants and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages (including court costs and reasonable attorney's fees) arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, E/A or any other party indemnified hereunder to the extent caused by or based upon performance of the work or failure to perform the Work.

- 6.9.2 During the progress of the Work and on a daily basis, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall, at a minimum, restore to original condition all property not designated for alteration by the Contact Documents. If the CONTRACTOR fails to clean up at the completion of the Work, OWNER may do so and the cost thereof will be charged against the CONTRACTOR.
- **6.9.3** CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.
- **6.10 Record Documents:** CONTRACTOR shall maintain in a safe place at the site, or other location acceptable to OWNER, one (1) record copy of all Drawings, Specifications, Addenda, Change Orders, Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.5) in good order and annotated to show all changes made during construction. These record documents together with all final samples and all final Shop Drawings will be available to OWNER and E/A for reference during performance of the Work. Upon Substantial Completion of the Work, these record documents, samples and Shop Drawings shall be promptly delivered to Owner's Representative.

# **6.11 Safety and Protection:**

- **6.11.1** CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Upon request, and prior to installation of measures, CONTRACTOR shall submit a site security plan for approval by OWNER. By reviewing the plan or making recommendations or comments, OWNER will not assume liability nor will CONTRACTOR be relieved of liability for damage, injury or loss. CONTRACTOR shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:
  - .1 all persons on the Work site or who may be affected by the Work;
  - **.2** all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
  - other property at the site or adjacent thereto, including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.
- **6.11.2** CONTRACTOR shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of underground facilities, and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.11.1.2 and 6.11.1.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, Subcontractor, Supplier or any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or

Specifications or to the acts or omissions of OWNER, or E/A, or E/A's consultant or anyone employed by any of them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the faults or negligence of CONTRACTOR or any Subcontractor, Supplier or other person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and Owner's Representative has issued a notice to OWNER and CONTRACTOR in accordance with Article 14 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). Without limitation, CONTRACTOR shall comply with the following specific provisions:

It shall be the duty and responsibility of CONTRACTOR and all of its subcontractors to be familiar with and comply with 29 USC Section 651, et seq., the Occupational Safety and Health Act of 1970, as amended ("OSHA") and to enforce and comply with all provisions of this Act.

The CONTRACTOR and all of its subcontractors shall comply with all applicable requirements of Subpart P of Part 1926 of 29 C.F.R, OSHA Safety and Health Standards, Texas Health and Safety Code Section 756.023, as amended, and shall submit a unit price for the particular excavation safety systems to be utilized by the Contractor for all excavations which exceed a depth of five feet (5').

Before commencing any excavation which will exceed a depth of five feet (5'), the CONTRACTOR shall provide the Owner with detailed plans and specifications regarding the safety systems to be utilized. Said plans and specifications shall include a certification from a Texas licensed professional engineer indicating full compliance with the OSHA provisions cited above.

- **6.11.3** Safety Representative: CONTRACTOR shall designate in writing a qualified and experienced safety representative (the "Safety Representative") at the site whose duties and responsibilities shall include safety training; identifying and mitigating hazardous conditions and unsafe work practices; and developing, maintaining and supervising the implementation of safe work practices and safety programs as deemed necessary and appropriate for the Project. The term "Safety Representative" includes any designated Safety Supervisor, Superintendent or Safety Manager. The Safety Representative shall exercise due diligence in the execution of all Project related safety duties. Upon request of OWNER, CONTRACTOR shall provide certifications or other acceptable documentation of the Safety Representative's qualifications. The following requirements will be effective as of September 1, 2010:
  - .1 The Safety Representative shall present certification of completion of the OSHA 30-hour Construction Industry Training Outreach Program described at: <a href="http://www.osha.gov/dte/outreach/construction\_generalindustry/construction.html">http://www.osha.gov/dte/outreach/construction\_generalindustry/construction.html</a>
  - .2 The Safety Representative shall verify that all construction workers (defined as persons covered by a prevailing wage determination) on the job site, whether employed by the CONTRACTOR or subcontractors, have completed the OSHA 10-hour Construction Industry Training Outreach Program described at: <a href="http://www.osha.gov/dte/outreach/construction\_generalindustry/construction.html">http://www.osha.gov/dte/outreach/construction\_generalindustry/construction.html</a>. The Safety Representative must receive a certificate of training completion before allowing a worker on site and shall have all such certificates available for inspection by the OWNER.
  - .3 The Safety Representative shall ensure that workers, including designated competent persons, have completed all applicable OSHA specific or other training needed to perform their job assignments. Training topics applicable

- to the scope of the current Project may include, but are not limited to, scaffolds, fall protection, cranes, excavations, electrical safety, tools, concrete and masonry construction, steel erection, operation of motor vehicles and mechanized equipment.
- .4 The Safety Representative shall post notice on the site of the Work stating that all workers shall have completed OSHA Construction Industry Training. The Owner may require, and the Safety Representative should consider providing a means of readily identifying workers who have completed the required training to monitor compliance with these requirements.
- .5 The Safety Representative shall ensure that all required OSHA and Workers Compensation notices to workers are posted in English and Spanish at one or more conspicuous locations on the work site.
- **6.11.4** Hazard Communication Programs: CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with laws and regulations.

#### **6.11.5** Emergencies:

- In emergencies affecting the safety or protection of persons or the Work at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or E/A, is obligated to act reasonably to prevent threatened damage, injury or loss and to mitigate damage or loss to the Work. CONTRACTOR shall give Owner's Representative telephone notification as soon as reasonably practical and a prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Owner's Representative determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Change Directive or Change Order will be issued to document the consequences of such action; otherwise OWNER will not be responsible for CONTRACTOR's emergency action.
- Authorized agents of CONTRACTOR shall respond immediately to call-out at any time of any day or night when circumstances warrant the presence on Project site of CONTRACTOR or his agent to protect the Work or adjacent property from damage, restriction or limitation or to take such action or measures pertaining to the Work as may be necessary to provide for the safety of the public. Should CONTRACTOR and/or their agent fail to respond and take action to alleviate such an emergency situation, OWNER may direct other forces to take action as necessary to remedy the emergency condition, and OWNER will deduct any cost of such remedial action from the funds due CONTRACTOR under this Contract.
- .3 In the event there is an accident involving injury to any individual or damage to any property on or near the Work, CONTRACTOR shall provide to Owner's Representative verbal notification within one (1) hour and written notification within twenty-four (24) hours of the event and shall be responsible for recording the location of the event and the circumstances surrounding the event through photographs, interviewing witnesses, obtaining medical reports, police accident reports and other documentation that describes the event. Copies of such documentation shall be provided to Owner's Representative, for OWNER's and E/A's records, within forty-eight (48) hours of the event.

Contractor shall cooperate with OWNER on any OWNER investigation of any such incident.

#### **6.11.6** Rest Breaks:

- .1 Except as provided in subsection 6.11.6.2 below, an employee performing construction activity at a construction site is entitled to a rest break of not less than ten (10) minutes for every four (4) hours worked. No employee may be required to work more than 3.5 hours without a rest break. A rest break means a break from work within working hours, excluding meal breaks, during which an employee may not work. A rest break shall be scheduled as near as possible to the midpoint of the work period.
- .2 An employee is not entitled to a rest break under subsection 6.11.6.1 on any day the employee works less than 3.5 hours or spends more than half of his or her work time engaged in non-strenuous labor in a climate controlled environment.
- **.3** A sign describing the requirements of this Section 6.11.6 in English and Spanish shall be posted by the employer in each establishment subject to the requirement of a rest break in a conspicuous place or places where notices to employees are customarily posted, in accordance with the OWNER's then current rules for size, content, and location of such signage.
- **.4** The violation of Ordinance No. 20100729-047, enacted July 29, 2010, which establishes the rest break requirements set forth above, may be enforced with criminal penalties and civil remedies, as set forth in the Ordinance.
- **6.11.7** If the Contractor fails to carry out the Work in accordance with the Contract Documents so that a safety violation has occurred, the Owner may order the Contractor to stop the Work or any portion thereof, until the cause for such order has been eliminated. However, the right of the Owner to stop the Work under this paragraph shall not give rise to a duty on the part of the Owner to supervise the Contractor's Work or to control the Contractor's means and methods or to exercise this right for the benefit of the Contractor or any other person or entity. All time lost due to Project shut down will be the Contractor's sole responsibility, will be charged against the Contract Time, and the Contractor will be responsible for any and all expenses incurred. This provision is in addition to and supplemental to the applicable provisions of the Project's ROCIP Safety Manual.

#### **6.11.8** Confined Space Program

contractor acknowledges and agrees that the Owner is temporarily transferring management and control of the site of the Work to the Contractor for the purpose of constructing the Project. The Contractor's responsibilities to manage the Work includes the responsibility to manage the property for purposes of compliance with 29 CFR 1926 subpart AA. To the best of Owner's knowledge and belief, Owner has provided the following information in the plans and specifications and other Contract Documents: (i) the location of each known permit space, (ii) the hazards or potential hazards in each space or the reason it is a permit space; and (iii) any precautions that the Owner or any previous contractor has implemented for the protection of employees in the permit space. This transfer will result in the Contractor being both the host employer and the controlling contractor for this portion of the Work.

**6.12 Continuing the Work:** CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as OWNER and CONTRACTOR may otherwise agree in writing.

# **6.13 CONTRACTOR's General Warranty and Guarantee:**

- **6.13.1** CONTRACTOR warrants and guarantees to OWNER that all Work will conform to the plans and specifications, be performed in a good and workmanlike manner in accordance with the Contract Documents and will not be defective. This warranty will survive the termination or expiration of the Contract. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:
  - **.1** abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or
  - .2 normal wear and tear under normal usage.
- **6.13.2** CONTRACTOR's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:
  - .1 observations by Owner's Representative and/or E/A;
  - .2 recommendation of any progress or final payment by Owner's Representative;
  - **.3** the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;
  - .4 use or occupancy of the Work or any part thereof by OWNER;
  - .5 any acceptance by OWNER or any failure to do so;
  - .6 any review of a Shop Drawing or sample submittal;
  - .7 any inspection, test or approval by others; or
  - **.8** any correction of defective Work by OWNER.

# **6.14 INDEMNIFICATION:**

- 6.14.1 CONTRACTOR shall defend, indemnify and hold harmless OWNER, E/A, E/A'S Consultants and Sub consultants and their respective officers, directors, partners, employees, agents and other Consultants and any of them (the "INDEMNIFIED PARTIES") from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage:
  - .1 Is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom, and

.2 Is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of the INDEMNIFIED PARTIES hereunder or whether liability is imposed upon such INDEMNIFIED PARTY by laws and regulations regardless of the negligence of any such person or entity.

In the event that indemnification of the INDEMNIFIED PARTIES is prohibited by law, CONTRACTOR shall nonetheless be solely responsible for any liability arising out of or resulting from the performance of the Work, subject to the limitations set forth above, and shall indemnify and hold harmless the remaining INDEMNIFIED PARTIES, who may be legally indemnified, from such liability of the CONTRACTOR and the associated costs described above.

- 6.14.2 The indemnification obligation under paragraph 6.14.1 shall not be limited in any way by any limitation on the amount or type of damages, or compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.
- 6.14.3 The obligations of CONTRACTOR under paragraph 6.14.1 shall not extend to the liability of OWNER, E/A, E/A's consultants, and their officers, directors, partners, employees or agents caused primarily by negligent preparation of maps, drawings, surveys, designs or specifications upon which is placed the applicable state-authorized design professional seal of OWNER's, E/A's or E/A's consultant's officers, directors, partners, employees or agents.
- 6.14.4 In the event CONTRACTOR fails to follow OWNER's directives concerning use of the site, scheduling or course of construction, or engages in other conduct which proximately causes damage to property based on inverse condemnation or otherwise, then and in that event, CONTRACTOR shall indemnify OWNER against all costs resulting from such claims.
- 6.14.5 In the event CONTRACTOR unreasonably delays progress of the work being done by others on the site so as to cause loss for

# which OWNER becomes liable, then CONTRACTOR shall indemnify OWNER from and reimburse OWNER for such loss.

- **6.15** Survival of Obligations: All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.
- **6.16 Losses from Natural Causes:** Unless otherwise specified, all loss or damage to CONTRACTOR arising out of the nature of the Work to be done or from action of the elements, floods or from unforeseeable circumstances in prosecution of the Work or from unusual obstructions or difficulties which may be encountered in prosecution of the Work, shall be sustained and borne by CONTRACTOR at its own cost and expense.
- **6.17 Notice of Claim:** Should CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of OWNER or of any of OWNER's employees or agents or others for whose acts OWNER is liable, a Claim must be made to the other party within thirty (30) calendar days of the event giving rise to such injury or damage. The provisions of this paragraph 6.17 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.
- **6.18 Liquidated Damages:** CONTRACTOR or its Surety shall be liable for liquidated damages for the failure of the CONTRACTOR to timely complete the Work or any portion thereof within the Contract Time.

# ARTICLE 7 - OTHER WORK

- 7.1 OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other contracts therefor, or have other work performed by utility owners. CONTRACTOR and OWNER agree to and shall use best efforts to cooperate and coordinate the Work with others performing work and other work related to the Project in order to avoid conflicts and delays in the Work. If CONTRACTOR believes that delay or additional cost is involved because of such action by OWNER, CONTRACTOR may make a Claim as provided in Article 11 or 12.
- 7.2 CONTRACTOR shall afford other contractors who are in a contract with OWNER and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of Owner's Representative and the other contractors whose work will be affected. CONTRACTOR shall promptly remedy damage wrongfully caused by CONTRACTOR to completed or partially completed construction or to property of the OWNER or separate contractors.
- 7.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to Owner's Representative in writing any delays, defects or deficiencies in

- such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in such other work.
- 7.4 OWNER shall provide for coordination of the activities of the OWNER's own forces and of each separate contractor with the Work of CONTRACTOR, who shall cooperate with them. CONTRACTOR shall participate with other separate contractors and Owner's Representative in reviewing their construction Progress Schedules when directed to do so. On the basis of such review, CONTRACTOR shall make any revisions to the construction Progress Schedule deemed necessary after a joint review and mutual agreement. The agreed upon construction Progress Schedules shall then constitute the Progress Schedules to be used by CONTRACTOR, separate contractors and OWNER until subsequently revised.
- **7.5** Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

# ARTICLE 8 - OWNER'S RESPONSIBILITIES

- **8.1** Prior to the start of construction, OWNER will designate in writing a person or entity to act as Owner's Representative during construction. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through Owner's Representative.
- **8.2** OWNER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto. OWNER is not responsible for any failure of CONTRACTOR to comply with laws and regulations applicable to furnishing or performing the Work. OWNER is not responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of OWNER to discover, or object to or condemn any defective Work or material shall not release CONTRACTOR from the obligation to properly and fully perform the Contract.
- **8.3** OWNER is not responsible for the acts or omissions of CONTRACTOR, or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work. CONTRACTOR acknowledges and agrees that OWNER'S direction to perform Work in accordance with the approved Progress Schedule is not a demand for acceleration or a dictation of CONTRACTOR'S means or methods.
- 8.4 Information or services under the OWNER's control shall be furnished by the OWNER with reasonable promptness to avoid delay in orderly progress of the Work. The OWNER shall have a reasonable amount of time to investigate site conditions, review submittals, analyze requests for changes, and to make other decisions in the orderly administration of the Contract. CONTRACTOR must notify the OWNER in writing, if the time for the investigation, review, analysis of any submittals, required for changes or otherwise required for OWNER'S decision, impacts in any way the Critical Path of the approved Progress Schedule.
- 8.5 The foregoing are in addition to other duties and responsibilities of the OWNER enumerated herein and especially those in respect to Article 4 (Availability of Lands; Subsurface and Physical Conditions; Reference Points), Article 7 (Other Work) and Article 14 (Payments to CONTRACTOR and Completion).
- **8.6 Notice of Claim:** Should OWNER suffer injury or damage to person or property because of any error, omission or act of CONTRACTOR or of any of CONTRACTOR's employees or agents or others for whose acts CONTRACTOR is liable, a Claim will be made to the other

party within thirty (30) calendar days of receipt of actual or constructive notice of the event giving rise to such injury or damage. The provisions of this paragraph 8.6 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

# ARTICLE 9 - ENGINEER/ARCHITECT'S STATUS DURING CONSTRUCTION

#### 9.1 E/A's Authority and Responsibilities:

- 9.1.1 The duties and responsibilities and the limitations of authority of E/A during construction, as set forth in the Contract Documents, may be assigned or assumed by the OWNER, but shall not be extended without written consent of OWNER and/or E/A. The assignment of any authority, duties or responsibilities to E/A under the Contract Documents, or under any agreement between OWNER and E/A, or any undertaking, exercise or performance thereof by E/A, is intended to be for the sole and exclusive benefit of OWNER and not for the benefit of CONTRACTOR, Subcontractor, Supplier, or any other person or organization, or for any surety or employee or agent of any of them.
- **9.1.2** E/A will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. E/A is not responsible for any failure of CONTRACTOR to comply with laws and regulations applicable to the furnishing or performing the Work. E/A is not responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of E/A to discover, or object to or condemn any defective Work or material shall not release CONTRACTOR from the obligation to properly and fully perform the Contract.
- **9.1.3** E/A is not responsible for the acts or omissions of CONTRACTOR, or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.
- **9.1.4** If OWNER and E/A agree, E/A will review the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by Article 14, but only to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.
- **9.1.5** The limitations upon authority and responsibility set forth in this paragraph 9.1 shall also apply to E/A's Consultants, Resident Project Representative and assistants.
- **9.2 E/A as Owner's Representative:** E/A may be designated as the Owner's Representative under paragraph 8.1.
- **9.3 Visits to Site:** If OWNER and E/A agree, E/A will make visits to the site at intervals appropriate to the various stages of construction as E/A deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, E/A will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. E/A will not be required to make exhaustive or continuous on-site

inspections to check the quality or quantity of the Work. E/A's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, E/A will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work. E/A's visits and on-site observations are subject to all the limitations on E/A's authority and responsibility set forth in paragraph 9.1.

- **9.4 Resident Project Representative:** If OWNER and E/A agree, E/A will furnish a Resident Project Representative to assist E/A in providing more continuous observation of the Work. The responsibilities and authority and limitations of any such Resident Project Representative and assistants will be as provided in paragraph 9.1 and in the Supplemental General Conditions. OWNER may designate another representative or agent to represent OWNER at the site who is not E/A, E/A's consultant, agent or employee.
- **9.5 Clarifications and Interpretations:** E/A may determine that written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) are necessary. Such written clarifications or interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents, will be issued with reasonable promptness by Owner's Representative and will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Amount or the Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in Article 11 or 12.
- **9.6 Rejecting Defective Work:** E/A will recommend that OWNER disapprove or reject Work which E/A believes to be defective, or believes will not produce a completed Project that conforms to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
- **9.7 Shop Drawings:** Refer to Division 1 for E/A's authority concerning Shop Drawings.

# ARTICLE 10 - CHANGES IN THE WORK

### 10.1 Changes:

- **10.1.1** Without invalidating the Contract and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such changes in the Work will be authorized by Change Order, Change Directive or Field Order. In the event that the OWNER and the CONRACTOR are unable to negotiate the terms of a Change Order for the performance of additional Work, the OWNER may, at its election, perform such additional Work with its own forces or with another contractor and such work will be considered "Other Work" in accordance with Article 7.
- 10.1.2 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and CONTRACTOR shall proceed promptly, unless otherwise provided in the Change Order, Change Directive or Field Order. CONTRACTOR's proposals for changes in the Contract Amount and/or Contract Time shall be submitted within ten (10) Calendar Days of request by Owner's Representative, including impacts to the approved Progress Schedule, unless Owner's Representative grants an extension. OWNER will review each proposal and respond to CONTRACTOR within ten (10) Calendar Days. After review by OWNER, CONTRACTOR shall provide any supporting data requested by Owner's Representative within seven (7) Calendar Days, unless Owner's Representative grants an extension. OWNER will determine within seven (7) Calendar Days whether to pursue the change in Work.

- **10.1.3** CONTRACTOR shall not be entitled to an increase in the Contract Amount or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.3.1 and 3.3.2, except in the case of an emergency as provided in paragraph 6.11.5 or in the case of uncovering Work as provided in paragraph 13.4.
- **10.1.4** Except in the case of an emergency as provided in paragraph 6.11.5, a Change Order or Change Directive is required before CONTRACTOR commences any activities associated with a change in the Work which, in CONTRACTOR 's opinion, will result in a change in the Contract Amount and/or Contract Times.
- **10.1.5** If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Amount or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

#### 10.2 Change Orders:

- **10.2.1** OWNER and CONTRACTOR shall execute appropriate written Change Orders covering:
  - .1 a change in the Work;
  - .2 the amount of the adjustment in the Contract Amount, if any; and
  - .3 the extent of the adjustment in the Contract Time, if any.
- **10.2.2** An executed Change Order shall represent the complete, equitable, and final amount of adjustment in the Contract Amount and/or Contract Time owed to CONTRACTOR or OWNER as a result of the occurrence or event causing the change in the Work encompassed by the Change Order.

#### 10.3 Change Directives:

- 10.3.1 Without invalidating the Contract, OWNER may, by written Change Directive, using the Force Account method, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Amount and Contract Time being adjusted as necessary. "Force Account" means a basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in Section 11.5, below. A Change Directive shall be used in the absence of complete and prompt agreement on the terms of a Change Order. Where practicable, any items of Work that may be agreed upon, prior to the performance of Work under this Section, will be included in a separate Change Order. For example, the cost of the installation of additional asphalt may be agreed upon based on the unit prices in the Bid.
- **10.3.2** If the Change Directive provides for an adjustment to the Contract Amount, the adjustment shall be based on the method provided in paragraph 11.5.
- **10.3.3** A Change Directive shall be effective immediately and shall be recorded later by preparation and execution of an appropriate Change Order.
- 10.3.4 Upon receipt of a Change Directive, CONTRACTOR shall promptly proceed with the change in the Work involved, provided, prior to the commencement of any Work under this section, the CONTRACTOR must submit its proposed Work plan, anticipated schedule, and a list of its work force and equipment proposed to be

used in the Work for OWNER'S approval. Upon such approval, CONTRACTOR must promptly commence and make continuous progress in the Work. The OWNER reserves the right to withhold payment for low production or lack of progress.

#### 10.4 Field Order:

- 10.4.1 Owner's Representative may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These shall be accomplished by written Field Order and shall be binding on OWNER and on CONTRACTOR who shall perform the Work involved promptly.
- 10.4.2 If CONTRACTOR believes that a Field Order would require an adjustment in the Contract Amount and/or Contract Times, CONTRACTOR shall make a prompt written request to Owner's Representative for a Change Order. Any request by CONTRACTOR for an adjustment in Contract Amount and/or Contract Times must be made in writing prior to beginning the work covered by the Field Order.
- 10.5 No Damages for Delay: CONTRACTOR shall receive no compensation for delays or hindrances to the Work, except when direct and unavoidable extra cost to CONTRACTOR is caused by failure of OWNER to provide information or material, if any, which is to be furnished by OWNER or access to the Work and only to the extent that such acts continue after the CONTRACTOR furnishes OWNER with written notice of such failure. When such extra compensation is claimed a written statement thereof shall be presented by CONTRACTOR to OWNER and if by OWNER found correct shall be approved. If delay is caused by specific orders given by OWNER to stop work or by performance of extra Work or by failure of OWNER to provide material or necessary instructions for carrying on the Work, then such delay will entitle CONTRACTOR to an equivalent extension of time, CONTRACTOR's application for which shall, however, be subject to approval of OWNER. No such extension of time shall release CONTRACTOR or surety on its performance bond from all CONTRACTOR's obligations hereunder which shall remain in full force until discharge of the Contract. In no event shall the CONTRACTOR be entitled to any compensation or recovery of any special damages in connection with any delays, including without limitation: consequential damages, lost opportunity costs, impact damages, or other similar damages. The OWNER'S exercise of any of its rights or remedies under the Contract Documents (including without limitation ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the OWNER'S exercise of such rights or remedies, shall not be construed as active interference in the CONTRACTOR'S performance of the Work. Except as otherwise provided herein, an extension of Contract Time, to the extent permitted under Article 12, shall be the sole remedy of the CONTRACTOR for any acknowledged delays.

# ARTICLE 11 - CHANGE OF CONTRACT AMOUNT

- **11.1** The Contract Amount is stated in the Agreement and, including authorized adjustments, is the total amount payable by OWNER to CONTRACTOR for performance of the Work under the Contract Documents.
- 11.2 The original Contract Amount may not be increased by more than twenty-five percent (25%) and it may not be decreased more than twenty-five percent (25%) without the consent of the CONTRACTOR to such decrease, except in the event of a termination for convenience under paragraph 15.2 or the failure of the City Council to appropriate sufficient

- funding for the Project, in which events it is agreed that the consent of the CONTRACTOR will not be required.
- 11.3 The Contract Amount shall only be changed by a Change Order. Any claim for an adjustment in the Contract Amount shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than thirty (30) calendar days) after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by claimant, and shall represent that the adjustment claimed covers all known amounts to which claimant is entitled as a result of said occurrence or event. If OWNER and CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Amount shall be determined as set out in Article 16.
- **11.4** Determination of Value of Work:
  - **11.4.1** The value of any Work covered by a Change Order for an adjustment in the Contract Amount will be determined by one or more of the following methods:
    - .1 by application of unit prices contained in the Contract Documents to the quantities of the items involved.
    - **.2** by a mutually agreed unit price, or lump sum properly itemized and supported by sufficient substantiating data, including documentation by subcontractors performing the work, to permit evaluation.
    - .3 by cost of Work plus CONTRACTOR's fee for all overhead costs and profit (determined as provided in paragraph 11.5).
    - .4 No cost will be included in the change order for time spent preparing the change order, nor will costs be included for an estimate of time to negotiate the change order costs for machinery, tools, or equipment as described in subparagraph 11.5.3
  - **11.4.2** Before using the method described in paragraph 11.4.1.3, OWNER and CONTRACTOR agree to negotiate a Change Order using the methods identified in paragraphs 11.4.1.1 and 11.4.1.2, as appropriate, to determine the adjustment in the Contract Amount.
- **11.5 Cost of Work:** If neither of the methods defined in paragraphs 11.4.1.1 nor 11.4.1.2 can be agreed upon before a change in the Work is commenced which will result in an adjustment in the Contract Amount, then the change in the Work will be performed by Change Directive, using the Force Account method, and payment will be made as follows:
  - 11.5.1 For all personnel, CONTRACTOR will receive actual field cost wage rates for each hour that said personnel are actually engaged in such Work, as substantiated by its certified payroll, to which will be added an amount equal to twenty-five percent (25%) of the sum thereof as compensation for CONTRACTOR's total overhead, profit, and small tools. No separate charge will be made by CONTRACTOR or its Subcontractor(s) for organization or overhead expenses. In no case will the rate of wage be less than the minimum shown in the Contract for a particular category. CONTRACTOR will also receive an amount equal to 55% of the wages paid personnel, excluding the 25% compensation provided above, for CONTRACTOR's and any effected Subcontractor's cost of premiums on public liability insurance, workers' compensation insurance, social security and unemployment insurance. The cost for superintendence, project management, and other salaried employees are considered as included in the twenty five percent (25%) total overhead, profit, and small tools mark-up unless considered necessary and ordered by Owner.

- **11.5.2** CONTRACTOR will receive the actual cost, including freight charges, of the materials used and installed on such Work, to which costs will be added a sum equal to twenty-five percent (25%) thereof as compensation for CONTRACTOR's and any affected Subcontractor's total overhead and profit. In case material invoices indicate a discount may be taken, the actual cost will be the invoice price minus the discount.
- 11.5.3 For machinery, trucks, power tools, or other similar equipment (the "equipment") agreed to be necessary by OWNER and CONTRACTOR, OWNER will allow CONTRACTOR the Regional and Model Year adjusted Monthly Ownership Cost divided by 176 plus the Hourly Estimated Operating Costs as given in the latest edition of the "Rental Rate Blue Book" as published by EquipmentWatch (1-800-669-3282) for each hour that said equipment is in use on such work. established equipment rates will be paid for each hour that the equipment is utilized in the Work. In the event that the equipment is used intermittently during the Work, full payment for an eight-hour day will be made if the equipment is not idle more than four (4) hours of the day. If the equipment is idle more than four (4) hours in a day, then payment will be made only for the actual hours worked. No additional compensation will be allowed on the equipment for CONTRACTOR's or any affected Subcontractor's overhead and profit. OWNER may accept an actual rental invoice in lieu of the method of calculation set forth in paragraph 11.5.3 for equipment rented exclusively for Force Account Work or for equipment not included in the Rental Rate Blue Book.
- **11.5.4** For Subcontractors, CONTRACTOR will receive the approved actual invoice cost plus 5% as compensation for CONTRACTOR's total overhead and profit.
- **11.5.5** CONTRACTOR will receive an additional 1% of the total of 11.5.1, 11.5.2, 11.5.3, and 11.5.4 as compensation for increased bond costs.
- 11.5.6 The compensation, as herein provided for, shall be received by CONTRACTOR and any affected Subcontractor as payment in full for work done by Change Directive and will include use of small tools, and total overhead expense and profit. CONTRACTOR and Owner's Representative shall compare records of work done by Change Directive at the end of each day. Copies of these records will be made upon forms provided for this purpose by OWNER and signed by both Owner's Representative and CONTRACTOR, with one copy being retained by OWNER and one by CONTRACTOR. Refusal by CONTRACTOR to sign these records within two (2) working days of presentation does not invalidate the accuracy of the record.

#### 11.6 Unit Price Work:

- 11.6.1 Where the Contract Documents provide that all or part of the Work is to be unit price Work, initially the Contract Amount will be deemed to include for all unit price work an amount equal to the sum of the established unit price for each separately identified item of unit price work times the estimated quantity of each item as indicated in the Bid. The estimated quantities of items of unit price work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Amount. Determinations of the actual quantities and classifications of unit price work performed by CONTRACTOR will be made by Owner's Representative. Owner's Representative will review with CONTRACTOR the preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise).
- **11.6.2** When "plan quantity" is indicated for a Bid item, CONTRACTOR shall be paid amount specified in the Contract Documents without any measurements.

- **11.6.3** Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.
- **11.6.4** A Major Item is any individual Bid item in the Bid that has a total cost equal to or greater than five percent (5%) of the original Contract Amount or \$50,000, whichever is greater, computed on the basis of Bid quantities and Contract unit prices.
- **11.6.5** OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Amount in accordance with Article 11 if:
  - .1 the actual quantity of any Major Item should become as much as twenty percent (20%) more than or twenty percent (20%) less than that in the Bid; or
  - CONTRACTOR presents documentation contesting accuracy of "plan quantity" and Owner's Representative verifies quantity and determines original value is in error by five percent (5%) or more;

Provided, however, in the event a Major Item is reduced by twenty percent (20%) or more of the amount in the Bid, no additional Article 11 profit or overhead will be added, if, due to other additions in the Work, the net value of the Contract Amount is not reduced.

# ARTICLE 12 - CHANGE OF CONTRACT TIMES

#### **12.1** Working Day and Calendar Day Contracts:

- 12.1.1 The Contract Times (or Milestones) may only be changed by Change Order or Time Extension Request duly executed by both CONTRACTOR and Owner's Representative. Any claim for an adjustment of the Contract Times (or Milestones) shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than thirty (30) calendar days after the start of the occurrence or event giving rise to the delay) and stating the general nature of the delay. Notice of the extent of the delay with supporting data shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by claimant, and shall represent that the adjustment claimed is the entire adjustment to which claimant is entitled as a result of said occurrence or event. If OWNER and CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Times (or Milestones) shall be determined as set out in Article 16. No Claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph.
- **12.1.2** When CONTRACTOR is at fault and OWNER stops the Work, so that corrections in the Work can be made by CONTRACTOR, no extension in time will be allowed.
- 12.1.3 When CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. If performance by the CONTRACTOR or OWNER is interrupted by any occurrence not occasioned by its own conduct, whether such occurrence be an act of god or the result of war, riot, civil commotion, sovereign conduct, or the conduct of a third party, then such performance will be excused for a period of time necessary to remedy its effects, provided, however, in such an

- event, a conference will be held within three (3) business days to establish a proposed new Progress Schedule for the Project.
- **12.1.4** OWNER will consider time extension requests and may grant CONTRACTOR an extension of time because of:
  - .1 Changes ordered in the work which justify additional time.
  - •2 Failure of materials or products being at the Project site due to delays in transportation or failures of Suppliers, which are not the result of CONTRACTOR's, Subcontractor's or Supplier's negligence. The request for an extension of time shall be supported by a citation of acts demonstrating that the delays are beyond CONTRACTOR's control, including, but not limited to, CONTRACTOR's efforts to overcome such delays documented as follows:
    - a) Copy of purchase order for delayed item(s) indicating date ordered by CONTRACTOR/ Subcontractor and date purchase order received by Supplier.
    - **b)** If item(s) require Shop Drawings or other submittal information in accordance with the Contract Documents, provide record of date submittal(s) forwarded to Owner's Representative, date submittal(s) returned to CONTRACTOR, and date submittal(s) forwarded to Supplier.
    - c) Copy of document(s) from Supplier, on Supplier's letterhead, indicating date(s) item(s) would be ready for shipment and/or actual shipment date(s).
    - d) Copies of all correspondence between CONTRACTOR / Subcontractor and Supplier indicating CONTRACTOR / Subcontractor's efforts to expedite item(s).
    - e) If item(s) are being purchased by a Subcontractor, provide correspondence, meeting notes, etc., that reflect CONTRACTOR's efforts with the Subcontractor to expedite delivery of the item(s).
  - OWNER delay progress of work through no fault of CONTRACTOR. The CONTRACTOR will only be entitled to an extension of time for delays that affect the Critical Path of the Work and that are not caused by the CONTRACTOR.
  - .4 When CONTRACTOR is delayed by strikes, lockouts, fires, losses from natural causes, or other unavoidable cause or causes beyond CONTRACTOR's control.

#### 12.2 Calendar Day Contracts:

- 12.2.1 Under a Calendar Day Contract, CONTRACTOR may be granted an extension of time because of unusual inclement weather, including but not limited to unusual rainfall events, which are beyond the normal rainfall recorded and expected for Austin, Texas. However, the CONTRACTOR will not be granted an extension of time for "normal rainfall", as described below.
- **12.2.2** "Unusual Inclement Weather" is defined as a rain event or other weather related event which occurs at the site and is of sufficient magnitude to prevent CONTRACTOR from performing units of Work critical to maintaining the Progress Schedule.

12.2.3 Baseline Rain Day Determination. "Normal rainfall" compiled by the State climatologist, based on U.S. Weather Bureau Records for Austin, Texas, is considered a part of the Calendar Day Contract, and is not a justification for an extension of time. Listed below are the number of days in each month for which no compensatory days for rainfall events ("Rain Days") in such months may be claimed:

January 8 days
February 8 days
March 7 days
April 7 days
May 9 days
June 6 days
July 5 days
August 5 days
September 7 days
October 7 days
November 7 days
December 7 days

Rain Days in addition to the baseline Rain Day determination described above will be measured with the Owner's Representative's approval at the nearest operational public weather data collection facility to the site, including but not limited to the OWNER's early warning flood gauge system.

12.2.4 CONTRACTOR may receive credit in any month for Unusual Inclement Weather, and specifically for any Rain Days in that month which exceed the number of Rain Days allocated to that month, if a Claim is made in accordance with paragraph 12.1.1 and the weather event meets the definition for "Unusual Inclement Weather", and as applicable, "Rain Day" and such claimed day is a day on which Work critical to maintaining the Progress Schedule is scheduled to be performed and is otherwise capable of being performed.

# ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

- **13.1 Notice of Defects:** Prompt notice of all defective Work of which OWNER or E/A has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected or accepted as provided in Article 13. CONTRACTOR must give OWNER and E/A prompt notice of any defective Work of which CONTRACTOR has actual knowledge.
- **13.2 Access to Work:** OWNER, E/A, E/A's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies having jurisdiction will have access to the Work at reasonable times for observing, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access, and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

# **13.3 Tests and Inspections:**

- **13.3.1** CONTRACTOR shall give timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- **13.3.2** OWNER shall employ and pay for services of an independent testing laboratory to perform all inspections, tests or approvals required by the Contract Documents except:
  - .1 for inspections, tests or approvals covered by paragraphs 13.3.3 and 13.3.4 below;
  - **.2** that costs incurred for tests or inspections conducted pursuant to paragraph 13.4.3 shall be paid as provided in paragraph 13.4.3;
  - **.3** for reinspecting or retesting defective Work, including any associated costs incurred by the testing laboratory for cancelled tests or standby time; and
  - **.4** as otherwise specifically provided in the Contract Documents.
- **13.3.3** If laws or regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith and furnish Owner's Representative the required certificates of inspection or approval.
- **13.3.4** CONTRACTOR shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for OWNER's and E/A's review of submittals covering materials, equipment, and mix designs to be incorporated in the Work.
- **13.3.5** All testing laboratories shall meet the requirements of ASTM E-329.

## 13.4 Uncovering Work:

- **13.4.1** If any Work (or the work of others) that is to be inspected, tested or approved is covered by CONTRACTOR without written concurrence of Owner's Representative, or if any Work is covered contrary to the written request of Owner's Representative, it must, if requested by Owner's Representative, be uncovered and recovered at CONTRACTOR's expense.
- **13.4.2** Uncovering Work as provided in paragraph 13.4.1 shall be at CONTRACTOR's expense unless CONTRACTOR has given Owner's Representative timely notice of CONTRACTOR's intention to cover the same and Owner's Representative has not acted within five (5) working days to such notice.
- 13.4.3 If Owner's Representative considers it necessary or advisable that covered Work be observed, inspected or tested, CONTRACTOR shall uncover, expose or otherwise make available for observation, inspection or testing that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Amount, and may make a Claim therefor as provided in Article 11. If,

however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Amount or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and CONTRACTOR may make a Claim therefor as provided in Articles 11 and 12.

## 13.5 OWNER May Stop the Work:

- **13.5.1** If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers, suitable materials, and/or equipment; or fails to furnish or perform the Work in such a way that the Work in progress or the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any surety or other party.
- **13.5.2** If CONTRACTOR fails to correct defective Work or submit a satisfactory plan to take corrective action, with procedure and time schedule, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until cause for such order has been eliminated, or take any other action permitted by this Contract. A notice to stop the Work, based on defects, shall not stop calendar or working days charged to the Project.
- promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Owner's Representative, remove it from the site and replace it with Work that is not defective. CONTRACTOR shall correct or remove and replace defective Work, or submit a plan of action detailing how the deficiency will be corrected, within the time frame identified in the notice of defective Work. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

#### 13.7 Warranty period:

- 13.7.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents (e.g. paragraph 14.11.2), any Work, including work performed after the Substantial Completion date, is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions:
  - (i) correct such defective Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not defective, and
  - (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom.

If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR. The warranty period will be deemed to be renewed and recommenced in connection with the completed items of Work requiring correction.

- **13.7.2** In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the warranty period for that item may start to run from an earlier date if so provided in the Contract Documents.
- **13.7.3** If correction of defective Work will affect the function or use of the facility CONTRACTOR shall not proceed with correction of defective Work without prior coordination and approval of OWNER.
- **13.7.4** The obligations of the CONTRACTOR to perform warranty work will survive the acceptance of the Work and any termination of the Contract.
- 13.8 Acceptance of Defective Work: If, instead of requiring correction or removal and replacement of defective Work, OWNER decides to accept it, OWNER may do so. CONTRACTOR shall pay all claims, costs, losses and damages attributable to OWNER's evaluation of and determination to accept such defective Work. If any such acceptance occurs prior to recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents and compensating OWNER for the diminished value of the defective Work. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER after a calculation by OWNER of the diminution in value of the defective Work.
- 13.9 OWNER May Correct Defective Work: If CONTRACTOR fails within a reasonable time after Written Notice of OWNER to correct defective Work, or to remove and replace rejected Work, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven (7) calendar days' Written Notice to CONTRACTOR, correct and remedy any such deficiency. If, in the opinion of the Owner's Representative, significant progress has not been made during this seven (7) calendar day period to correct the deficiency, the OWNER may exercise any actions necessary to remedy the deficiency. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, its agents and employees, OWNER's other contractors, E/A and E/A's consultants access to the site to enable OWNER to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones), or claims of damage because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

# ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

## **14.1** Application for Progress Payment:

**14.1.1** Within 45 days from when the work was performed by the Contractor and Subcontractors, but not more often than once a month, CONTRACTOR shall submit to Owner's Representative for review an Application for Payment, in a form

- acceptable to OWNER, filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
- **14.1.2** Such applications shall not include requests for payment on account of changes in the Work which have been properly authorized by Change Directives but not yet included in Change Orders.
- **14.1.3** Such applications shall not include requests for payment of amounts the CONTRACTOR does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason.
- 14.1.4 If payment is requested on the basis of materials or equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall be accompanied by such bills of sale, data and other procedures satisfactory to OWNER substantiating OWNER's title to such materials or equipment or otherwise protecting OWNER's interest. Payment on account of such materials or equipment will not include any amount for CONTRACTOR's overhead or profit or relieve CONTRACTOR of its obligation to protect and install such materials or equipment in accordance with the requirements of the Contract and to restore damaged or defective Work. If materials or equipment are stored at another location, at the direction of the OWNER they shall be stored in a bonded and insured facility, accessible to E/A and OWNER, and shall be clearly marked as property of OWNER. Title to materials delivered to the site of the Work or a staging area will pass to OWNER upon payment by OWNER without the necessity for further documentation. Risk of loss will not pass to OWNER until acceptance.
- Where the original Contract Amount is less than \$400,000, OWNER will pay 14.1.5 CONTRACTOR total amount of approved Application for Payment, less ten percent (10%) of amount thereof, which ten percent (10%) will be retained until final payment, less all previous payments and less all other sums that may be retained by OWNER under the terms of this Agreement. Where the original Contract Amount is \$400,000 or more, OWNER will pay CONTRACTOR total amount of approved Application for Payment, less five percent (5%) of amount thereof, which five percent (5%) will be retained until final payment, less all previous payments and less all other sums that may be retained by OWNER under the terms of this Agreement. In either case, if the Work is near completion and delay occurs due to no fault or neglect of CONTRACTOR, OWNER may pay a portion of the retained amount to CONTRACTOR. CONTRACTOR, at OWNER's option, may be relieved of the obligation to complete the Work and, thereupon, CONTRACTOR shall receive payment of the balance due under the Contract subject to the conditions stated under paragraph 15.2. A Subcontractor may submit a written request to the CONTRACTOR and Project Manager requesting release of retainage for work by the Subcontractor that has been completed and approved. The Project Manager will evaluate the request and if it is approved, the Project Manager will request the CONTRACTOR to include the request for release of an appropriate amount of retainage in the next Pay Application.
- **14.1.6** Applications for Payment shall include the following documentation:
  - .1 updated Progress Schedule;
  - .2 monthly subcontractor report;
  - .3 any other documentation required under the Supplemental General Conditions.

**14.2 CONTRACTOR's Warranty of Title:** CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER free and clear of all Liens no later than the time of payment to CONTRACTOR.

# **14.3** Review of Applications for Progress Payment:

- **14.3.1** Owner's Representative will, within seven (7) calendar days after receipt of each Application for Payment, either indicate a recommendation for payment and forward the Application for processing by OWNER, or return the Application to CONTRACTOR indicating Owner's Representative's reasons for refusing to recommend payment. In the latter case, CONTRACTOR shall make the necessary corrections and resubmit the Application.
- **14.3.2** Owner's Representative's recommendation of any payment requested in an Application for Payment will constitute a representation by Owner's Representative, based upon Owner's Representative's on-site observations of the executed Work and on Owner's Representative's review of the Application for Payment and the accompanying data and schedules, that to the best of Owner's Representative's knowledge, information and belief:
  - .1 the Work has progressed to the point indicated; and
  - .2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for unit price Work, and to any other qualifications stated in the recommendation).
- **14.3.3** By recommending any such payment, Owner's Representative will not thereby be deemed to have represented that:
  - exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work;
  - .2 examination has been made to ascertain how or for what purpose CONTRACTOR has used money previously paid on account of the Contract Amount;
  - **.3** CONTRACTOR's construction means, methods, techniques, sequences or procedures have been reviewed; or
  - •4 that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

#### 14.4 Decisions to Withhold Payment:

- **14.4.1** OWNER may withhold or nullify the whole or part of any payment to such extent as may be necessary on account of:
  - **.1** defective Work not remedied;
  - .2 third party Claims filed or reasonable evidence indicating probable filing of such Claims;
  - .3 failure of CONTRACTOR to make payments properly to Subcontractors for labor, materials or equipment;

- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Amount;
- .5 damage to OWNER or another contractor;
- reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 failure of CONTRACTOR to submit a schedule of values in accordance with the Contract Documents;
- **.8** failure of CONTRACTOR to submit a submittal schedule in accordance with the Contract Documents:
- **.9** failure of CONTRACTOR to submit and update a construction Progress Schedule in accordance with the Contract Documents;
- .10 failure of CONTRACTOR to maintain a record of changes on drawings and documents;
- **.11** failure of CONTRACTOR to maintain weekly payroll reports and, as applicable, provide copies of reports in a timely manner upon request of OWNER;
- .12 failure of CONTRACTOR to submit monthly subcontractor reports;
- **.13** CONTRACTOR's neglect or unsatisfactory prosecution of the Work, including failure to clean up;
- **.14** failure of CONTRACTOR to comply with the Austin City Code, Chapter 2-9-A, as amended, "Minority-Owned and Women-Owned Business Enterprise Procurement Program;" or
- **.15** failure of CONTRACTOR to comply with any provision of the Contract Documents.
- **14.4.2** When the above reasons for withholding payment are removed, CONTRACTOR shall resubmit a statement for the value of Work performed. Payment will be made within thirty (30) calendar days of receipt of approved Application for Payment.
- 14.4.3 Subcontractors may request Partial Payment when the OWNER withholds payment of an invoice to the CONTRACTOR for any reason listed in Section 14.4.1. If payment is withheld by the OWNER, the CONTRACTOR shall notify all affected Subcontractors within two (2) working days of notice that payment is being withheld. Upon notification, Subcontractors may submit a formal written request for Partial Payment to the CONTRACTOR and OWNER. If directed by the OWNER, the CONTRACTOR shall within three (3) working days resubmit to the OWNER an invoice for the same period that includes only the work performed by the requesting Subcontractors during this period. The OWNER will review this resubmitted invoice in accordance with Section 14.3.1. Upon receipt of payment for the resubmitted invoice, CONTRACTOR shall pay the subcontractor within ten (10) Calendar Days in accordance with Section 6.4.7.
- 14.5 Delayed Payments: Should OWNER fail to make payment to CONTRACTOR of sum named in any Application for Payment within thirty (30) calendar days after the day on which OWNER received the mutually acceptable Application for Payment, then OWNER will pay to CONTRACTOR, in addition to sum shown as due by such Application for Payment, interest thereon at the rate specified in Government Code, Section 2251.025(b) from date due until fully paid, which shall fully liquidate any injury to CONTRACTOR growing out of such delay in payment.

**14.6 Arrears:** No money shall be paid by OWNER upon any claim, debt, demand or account whatsoever, to any person, firm or corporation who is in arrears to City for taxes; and City shall be entitled to counterclaim and automatically offset against any such debt, claim, demand or account in the amount of taxes so in arrears and no assignment or transfer of such debt, claim, demand or account after said taxes are due, shall affect the right of OWNER to so offset said taxes, and associated penalties and interest if applicable, against the same.

# **14.7 Substantial Completion:**

- **14.7.1** When the CONTRACTOR considers that the Work, or a portion thereof which the OWNER agrees to accept separately, is substantially complete, the CONTRACTOR shall notify Owner's Representative and request a determination as to whether the Work or designated portion thereof is substantially complete. If Owner's Representative does not consider the Work substantially complete, Owner's Representative will notify CONTRACTOR giving reasons therefor. After performing any required Work, CONTRACTOR shall then submit another request for Owner's Representative to determine Substantial Completion. If Owner's Representative considers the Work substantially complete, Owner's Representative will prepare and deliver a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall include a punch list of items to be completed or corrected before final payment, shall establish the time within which CONTRACTOR shall finish the punch list, and shall establish responsibilities of the OWNER and CONTRACTOR for security, maintenance, heat, utilities, damage to the Work, warranty and insurance. Failure to include an item on the punch list does not alter the responsibility of CONTRACTOR to complete all Work in accordance with the Contract Documents. If a Certificate of Occupancy is required by public authorities having jurisdiction over the Work, said certificate shall be issued before the Work or any portion thereof is considered substantially complete. The certificate of Substantial Completion shall be signed by OWNER and CONTRACTOR to evidence acceptance of the responsibilities assigned to them in such certificate.
- **14.7.2** OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER will allow CONTRACTOR reasonable access to complete or correct items on the punch list and complete warranty work.
- **14.8 Partial Utilization:** Use by OWNER, at OWNER's option, of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) OWNER and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work in accordance with the following:
  - 14.8.1 OWNER at any time may request CONTRACTOR to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR shall certify to Owner's Representative that such part of the Work is substantially complete and request Owner's Representative to issue a certificate of substantial Completion for that part of the Work. CONTRACTOR at any time may notify Owner's Representative that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request Owner's Representative to issue a certificate of Substantial Completion for that part of the Work. The provisions of paragraphs 14.7.1 and 14.7.2 will apply with respect to certification of Substantial Completion

- of that part of the Work and the division of responsibility in respect thereof and access thereto.
- **14.8.2** Such partial utilization is authorized by public authorities having jurisdiction over the Work.
- **14.9 Final Inspection:** Upon Written Notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, Owner's Representative will make a final inspection with CONTRACTOR and provide Written Notice of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.
- **14.10 Final Application for Payment:** CONTRACTOR may make application for final payment following the procedure for progress payments after CONTRACTOR has completed all such corrections to the satisfaction of Owner's Representative and delivered the following documents:
  - **14.10.1** Affidavit by CONTRACTOR certifying the payment of all debts and claims;
  - **14.10.2** Three (3) complete operating and maintenance manuals, each containing maintenance and operating instructions, schedules, guarantees, and other documentation required by the Contract Documents;
  - **14.10.3** Record documents (as provided in paragraph 6.10);
  - **14.10.4** Consent of surety, if any, to final payment. If surety is not provided, complete and legally effective releases or waivers (satisfactory to OWNER) of all claims arising out of or filed in connection with the Work;
  - **14.10.5** Certificate evidencing that insurance required by the Supplemental General Conditions will remain in force after final payment and through the warranty period;
  - **14.10.6** Non-Use of Asbestos Affidavit (After Construction);
  - **14.10.7** Subcontractor report and all other documentation necessary for evaluation of CONTRACTOR's fulfillment of the Contract MBE/WBE or DBE goals;
  - **14.10.8** Documentation of notice to claimants, to the extent applicable and subject to subparagraph 14.11.4;
  - **14.10.9** Proof of performance Bond extension through warranty period, if a performance Bond was required; and
  - **14.10.10** Any other documentation called for in the Contract Documents.

#### 14.11 Final Payment and Acceptance:

14.11.1 If, on the basis of observation of the Work during construction, final inspection, and review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Owner's Representative is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled and there are no outstanding claims, Owner's Representative will recommend the final Application for Payment and thereby notify the OWNER, who will pay to CONTRACTOR the balance due CONTRACTOR under the terms of the Contract. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation, CONTRACTOR may execute a revegetation letter with fiscal posted (letter of credit) to ensure completion of this item. This Work must be accomplished within one hundred twenty (120) Calendar Days of the date of Final Completion of the Work. When

the permanent erosion control has been established, OWNER will initiate an inspection for final acceptance of the erosion controls. If the revegetation is not completed within the one hundred twenty (120) Calendar Days, OWNER, at its option, may complete the Work using the posted fiscal.

- **14.11.2** If the Contract measures Contract Time to Final Completion, rather than Substantial Completion, Owner's Representative will issue a letter of final acceptance to CONTRACTOR which establishes the Final Completion date and initiates the one-year warranty period. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation and CONTRACTOR has executed a revegetation letter with fiscal posted (letter of credit) to ensure completion of this item, the Owner's Representative will issue a letter of conditional acceptance to CONTRACTOR which established the Final Completion date and initiates the one-year warranty period.
- **14.11.3** Final payment is considered to have taken place when CONTRACTOR or any of its representatives negotiates OWNER's final payment check, whether labeled final or not, for cash or deposits check in any financial institution for its monetary return.
- **14.11.4** The OWNER will withhold funds sufficient to cover the amount of any unresolved contract claims from final payment for six months under the following limited conditions:
  - .1 CONTRACTOR must provide written notice to the claimant (via certified mail or hand delivery) that (i) OWNER will hold funds in the amount of the disputed claim for six (6) months from the date of the receipt of the notice and (ii) CONTRACTOR and the claimant have certain alternative dispute resolution rights; and
  - .2 CONTRACTOR must provide OWNER with a copy of the receipted notice.

Provided the claimant has received notice under this section, OWNER will release the withheld funds, if the CONTRACTOR provides a bond in substantial compliance with the provisions of Section 52.231 of the Texas Property Code; when the OWNER receives a settlement or release of the claim with accompanying instructions regarding payment; upon resolution of the claim in litigation, if suit is filed within such six (6) month period and the OWNER receives written notice of such filing; or when such six (6) month period has passed, if no such bond, settlement, release, or notice of filing of suit have been received. The above provisions notwithstanding, if efforts to timely resolve a disputed claim are not being made to OWNER'S reasonable satisfaction, OWNER may, in its complete discretion, file an interpleader action and deposit the withheld funds in the registry of a court of competent jurisdiction. In addition, CONTRACTOR must include a provision in each of its subcontracts that the prevailing party in any litigation arising thereunder will be entitled to recover its costs of court and reasonable attorney's fees.

- **14.12 Waiver of Claims:** The making and acceptance of final payment will constitute:
  - **14.12.1** a waiver of claims by OWNER against CONTRACTOR, except claims arising from unsettled claims, from defective Work appearing after final inspection, from failure to comply with the Contract Documents or the terms of any warranty specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and
  - **14.12.2** a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

# ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

- 15.1 OWNER May Suspend Work Without Cause: At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than ninety (90) calendar days by Written Notice to CONTRACTOR which will fix the date on which the Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Amount or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved Claim therefor as provided in Articles 11 and 12.
- **15.2 OWNER May Terminate Without Cause:** Upon seven (7) calendar days' Written Notice to CONTRACTOR, OWNER may, without cause and without prejudice to any right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):
  - **15.2.1** for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
  - **15.2.2** for reasonable demobilization costs; and
  - **15.2.3** for anticipated profits on completed and accepted Work not previously paid and not included in separate pay items calculated to date of termination but not for anticipated profit on the entire Contract not previously paid, unabsorbed overhead, or lost opportunity.

## 15.3 OWNER May Terminate With Cause:

- **15.3.1** Upon the occurrence of any one or more of the following events:
  - .1 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents;
  - .2 if CONTRACTOR disregards laws or regulations of any public body having jurisdiction;
  - .3 if CONTRACTOR disregards the authority of Owner's Representative;
  - .4 if CONTRACTOR makes fraudulent statements;
  - .5 if CONTRACTOR fails to maintain a work force adequate to accomplish the Work within the Contract Time;
  - **.6** if CONTRACTOR fails to make adequate progress and endangers successful completion of the Contract; or
  - .7 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any) seven (7) calendar days Written Notice terminate the services of CONTRACTOR. OWNER, at its option, may proceed with negotiation with surety for completion of the Work. Alternatively, OWNER may under these circumstances exclude CONTRACTOR from the site and take possession of the Work (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Amount exceeds all claims, costs,

losses and damages sustained by OWNER arising out of or resulting from completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses and damage exceed such unpaid balance, CONTRACTOR or surety shall pay the difference to OWNER. In the event that a termination for cause is found to be wrongful, the termination shall be converted to a termination without cause as set forth in Section 15.2 and CONTRACTOR'S remedy for wrongful termination is limited to the recovery of the payments permitted for termination without cause as set forth in Section 15.2.

- 15.3.2 Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR and surety then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability. In the event OWNER terminates Contract with cause, OWNER may reject any and all Bids submitted by CONTRACTOR for up to three (3) years after the date of such termination. These sanctions will be administered in accordance with the City of Austin Purchasing Office Probation, Suspension, and Debarment Procedures for Vendors, which include notice and an opportunity for a hearing.
- **15.4 CONTRACTOR May Stop Work or Terminate:** If through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety (90) calendar days by OWNER or under an order of court or other public authority, or (except during disputes) Owner's Representative fails to forward for processing any mutually acceptable Application for Payment within thirty (30) calendar days after it is submitted, or (except during disputes) OWNER fails for sixty (60) calendar days after it is submitted to pay CONTRACTOR any sum finally determined by OWNER to be due, then CONTRACTOR may, upon seven (7) calendar days' Written Notice to OWNER, and provided OWNER does not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.2. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if (except during disputes) Owner's Representative has failed to forward for processing any mutually acceptable Application for Payment within thirty (30) calendar days after it is submitted, or (except during disputes) OWNER has failed for sixty (60) calendar days after it is submitted to pay CONTRACTOR any sum finally determined by OWNER to be due, CONTRACTOR may upon seven (7) calendar days' Written Notice to OWNER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.4 are not intended to preclude CONTRACTOR from making a Claim under Articles 11 and 12 for an increase in Contract Amount or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.
- 15.5 Discretionary Notice to Cure: In its complete discretion, OWNER may, but is not required to, provide a Notice to Cure to CONTRACTOR and its surety to cure an event of default described above and/or an anticipatory breach of contract and, if required by OWNER, to attend a meeting with OWNER, regarding the Notice to Cure, the event of default, and/or the anticipatory breach of contract. The Notice to Cure will set forth the time limit in which the cure is to be completed or commenced and diligently prosecuted. Upon receipt of any Notice to Cure, CONTRACTOR shall prepare a report describing its program and measures to affect the cure of the event of default and/or anticipatory breach of contract within the time required by the Notice to Cure. The CONTRACTOR'S report must be delivered to OWNER at least three (3) days prior to any requested meeting with the OWNER and surety.
- **15.6 Bankruptcy:** If CONTRACTOR declares bankruptcy or is adjudged bankrupt or makes an assignment for the benefit of creditors or if a receiver is appointed for the benefit of creditors or if a receiver is appointed by reason of CONTRACTOR'S insolvency, CONTRACTOR may be unable to perform this Contract in accordance with the Contract

requirements. In such an event, OWNER may demand CONTRACTOR or its successor in interest provide OWNER with adequate assurance of CONTRACTOR'S future performance in accordance with the terms and conditions of the Contract. If CONTRACTOR fails to provide adequate assurance of future performance to OWNER'S reasonable satisfaction within ten (10) days of such a request, OWNER may terminate the CONTRACTOR'S services for cause or without cause, as set forth above. If CONTRACTOR fails to provide timely adequate assurance of its performance and actual performance, OWNER may prosecute the Work with its own forces or with other contractors on a time and material or other appropriate basis and the cost of which will be charged against the Contract balance.

- **15.7 Duty to Mitigate:** In the event of any termination or suspension under this Contract, the CONTRACTOR agrees to and shall take all reasonable actions to mitigate its damages and any and all claims which may be asserted against the OWNER.
- **15.8 Responsibility during Demobilization:** While demobilizing, the CONTRACTOR will take all necessary and reasonable actions to preserve and protect the Work, the site and other property of the OWNER or others at the site.

# ARTICLE 16 - DISPUTE RESOLUTION

## **16.1** Filing of Claims:

- 16.1.1 Claims arising from the circumstances identified in paragraphs 3.2, 4.1, 4.2.2, 4.2.4, 6.4.2, 6.11.5.2, 6.17, 7.5, 8.6, 9.5, 10.4.2, 13.4.3, 13.8, 13.9, 15.1, 15.2, 15.3, or 15.4, or other occurrences or events, shall be made by Written Notice delivered by the party making the Claim to the other party within thirty (30) calendar days after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered in writing within thirty (30) calendar days after Written Notice of Claim is delivered by claimant and shall represent that the adjustment claimed covers all known amounts and/or extensions of time to which claimant is entitled.
- **16.1.2** Within thirty (30) calendar days of receipt of notice of the amount of the Claim with supporting data, Owner's Representative and CONTRACTOR shall meet to discuss the Claim, after which an offer of settlement or notification of no settlement offer will be made to claimant. If claimant is not satisfied with the proposal presented, claimant shall have thirty (30) calendar days in which to: (i) submit additional supporting data requested by the other party; (ii) modify the initial Claim; or (iii) request Alternative Dispute Resolution.

## **16.2** Alternative Dispute Resolution:

- **16.2.1** If a dispute exists concerning a Claim, the parties agree to use the following procedure prior to pursuing any other available remedies. OWNER reserves the right to include the E/A as a party.
- 16.2.2 Negotiating with Previously Uninvolved Personnel: Either party may make a written request for a meeting to be held between representatives of each party within fourteen (14) Calendar Days of the request or such later period that the parties may agree to. Each party shall endeavor to include, at a minimum, one (1) previously uninvolved senior level decision maker (an owner, officer, or employee of each organization) empowered to negotiate on behalf of their organization. If a previously uninvolved senior level decision maker is unavailable due to the size of the CONTRACTOR'S organization or any other reason, the

CONTRACTOR shall nonetheless provide an appropriate senior level decision maker for the meeting. The purpose of this and any subsequent meetings will be good faith negotiations of the matters constituting the dispute. Negotiations shall be concluded within thirty (30) Calendar Days of the first meeting, unless mutually agreed otherwise. This step may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.

#### 16.2.3 Mediation:

- .1 If the procedure described in 16.2.2 proves unsuccessful or is waived pursuant to its terms, the parties shall initiate the mediation process. OWNER and CONTRACTOR agree to select within thirty (30) calendar days a mediator trained in mediation skills, to assist with resolution of the dispute. OWNER and CONTRACTOR agree to act in good faith in the selection of the mediator and to give consideration to qualified individuals nominated to act as mediator. Nothing in this agreement prevents the parties from relying on the skills of a person who also is trained in the subject matter of the dispute and/or a contract interpretation expert. Should the parties fail to agree on a mediator within thirty (30) calendar days of initiation of the mediation process, the parties agree to ask the Travis County Dispute Resolution Center to select a qualified individual, which selection shall be binding on the parties.
- .2 Mediation is a forum in which an impartial person, the mediator, facilitates communication between parties to promote reconciliation, settlement, or understanding among them. The parties hereby agree that mediation, at a minimum, shall provide for (i) conducting an on-site investigation, if appropriate, by the mediator for fact gathering purposes, (ii) a meeting of all parties for the exchange of points of view and (iii) separate meetings between the mediator and each party to the dispute for the formulation of resolution alternatives. The parties agree to participate in mediation in good faith for up to thirty (30) calendar days from the date of the first mediation session, unless mutually agreed otherwise. Should the parties fail to reach a resolution of the dispute through mediation, then each party is released to pursue other remedies available to them.
- 16.3 Resolution of Disputes between Contractor and Subcontractor or Supplier: If a dispute exists concerning a claim between a CONTRACTOR and a Subcontractor or Supplier, the CONTRACTOR agrees to participate with such Subcontractor and/or Supplier in a process substantially paralleling the steps set out in paragraphs 16.1 and 16.2 above, including the delivery of written notices, submission of supporting data, negotiation with previously uninvolved personnel, and, if such alternative dispute resolution process is unsuccessful, mediation between the parties to the claim. If the CONTRACTOR and Subcontractor or Supplier agreement provides an alternative dispute resolution process, which provides substantially equivalent rights to those set forth herein, it may be followed, unless the CONTRACTOR and affected Subcontractor or Supplier agree to follow the process outlined above. The OWNER is not a party to the alternative dispute resolution process between the CONTRACTOR and Subcontractor or Supplier and will not pay any costs incurred in the process. Each party will be responsible for its own expenses incurred in the process, which will include an equal share of the mediation expenses, unless otherwise determined by the mediator. NOTICE: THE PROCESS SET FORTH HEREIN IS NOT A SUBSTITUTE FOR THE STATUTORY PAYMENT BOND CLAIM PROCESS.

#### 16.4 Claim Calculation:

- 16.4.1 Delay Claims: The intent of paying for delay damages is to reimburse the CONTRACTOR for actual expense arising out of a compensable delay. No profit or force account markups, other than labor burden, will be allowed for delay claims by the CONTRACTOR seeking reimbursement for expenses arising out of an alleged event of delay. No consequential damages will be allowed to the CONTRACTOR in connection with any claimed delays. If the CONTRACTOR requests compensation for delay damages and the delay is determined to be compensable, then standby equipment costs and project overhead compensation will be based on the duration of the compensable delay and the following:
  - Standby equipment costs will not be allowed during periods when the equipment would have otherwise been idle. Standby equipment time will not exceed more than eight (8) hours per twenty-four (24) hour day, forty (40) hours per week, and one hundred seventy-six (176) hours per month. Standby equipment costs will be paid at 50 percent (50%) of the applicable Rental Rate Blue Book rates and calculated by dividing the monthly rate by one hundred seventy-six (176), multiplying the result by the number of standby hours and multiplying that number by the regional adjustment factor and the rate adjustment factor contained in the Blue Book. Operating costs will not be allowed.
  - .2 Project overhead will be determined from actual costs that the CONTRACTOR will be required to document. Project overhead is defined as the administrative and supervisory expenses incurred at the work site and will not include home office overhead.
- **16.4.2** General: Except as limited with respect to delay claims, as set forth above, the criteria set forth in Section 11.4.1 may be used as a basis to calculate an adjustment in the Contract Amount in the resolution of a claim, provided that there will be no compensation for home office overhead.
- 16.5 MBE/WBE Program Progressive Sanctions: CONTRACTOR is subject to progressive sanctions for failure of CONTRACTOR to comply with Austin City Code, Chapter 2-9A, as amended: "Minority-owned and Women-owned Business Enterprise Procurement Program." Available sanctions for Program violations are set forth in Program rules adopted by the Small and Minority Business Resources Department (SMBR), as amended, and may include the following progressive sanctions for Program violations within a rolling 24-month period: (i) a period of probation for up to six (6) months for the first violation (ii) a period of suspension from bidding for up to 24 months for the second violation, and (iii) a period of debarment for up to five (5) years for the third violation. If the CONTRACTOR engages in more than one of the violations listed below at any given time, OWNER has the discretion to determine whether such actions should be counted as multiple violations of the MBE/WBE Ordinance. Program violations include:
  - providing false or misleading information to the OWNER in connection with the submission of a Bid, responses to request for qualifications or Proposals, Good Faith Efforts documentation, post award compliance or other Program operations;
  - .2 substituting M/WBE Subcontractors without first receiving approval for such substitutions;
  - failure to comply with the approved Compliance Plan without an approved request for a change, an approved Change Order or other approved change to the Contract;
  - violation of any other provision of the "Minority-owned and Women-owned Business Enterprise Procurement Program";

- providing false or misleading information to the OWNER in connection with an application for or challenge to certification, recertification or decertification as a MBE/WBE; and
- **.6** bid shopping.

The Progressive Sanctions will be administered in accordance with the City of Austin Purchasing Office Probation, Suspension, and Debarment Procedures for Vendors, which includes notice and an opportunity for a hearing.

# ARTICLE 17 - MISCELLANEOUS

- 17.1 Venue: In the event of any suit at law or in equity involving the Contract, venue shall be exclusively in Travis County, Texas and the laws of the State of Texas shall apply to the interpretation and enforcement of the Contract.
- **17.2 Extent of Agreement:** This Contract represents the entire and integrated agreement between the OWNER and CONTRACTOR with respect to the subject matter hereof and supersedes all prior negotiations, representations or agreements, either written or oral.
- 17.3 Cumulative Remedies: The rights and remedies available to the parties are not to be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations, by special warranty or guarantees or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. Specifically, the OWNER is not required to only assess liquidated damages, and OWNER may elect to pursue its actual damages resulting from the failure of the CONTRACTOR to complete the Work in accordance with the requirements of the Contract Documents.
- **17.4 Severability:** If any word, phrase, clause, sentence or provision of the Contract, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, invalid or unenforceable, that finding shall only effect such word, phrase, clause, sentence or provision, and such finding shall not affect the remaining portions of this Contract; this being the intent of the parties in entering into the Contract; and all provisions of the Contract are declared to be severable for this purpose.
- **17.5 Independent Contractor:** The Contract shall not be construed as creating an employer/employee relationship, a partnership, or a joint venture. CONTRACTOR is an independent contractor and CONTRACTOR's services shall be those of an independent contractor. CONTRACTOR agrees and understands that the Contract does not grant any rights or privileges established for employees of OWNER.
- 17.6 Prohibition of Gratuities: OWNER may, by Written Notice to CONTRACTOR, terminate the Contract without liability if is determined by OWNER that gratuities were offered or given by CONTRACTOR or any agent or representative of CONTRACTOR to any officer or employee of OWNER with a view toward securing the Contract or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such Contract. In the event the Contract is terminated by OWNER pursuant to this provision, OWNER shall be entitled, in addition to any other rights

- and remedies, to recover or withhold the amount of the cost incurred by CONTRACTOR in providing such gratuities.
- 17.7 Prohibition Against Personal Interest in Contracts: No officer, employee, independent consultant, or elected official of OWNER who is involved in the development, evaluation, or decision-making process of the performance of any solicitation shall have a financial interest, direct or indirect, in the Contract resulting from that solicitation. Any violation of this provision, with the knowledge, expressed or implied, of CONTRACTOR shall render the Contract voidable by OWNER.

## 17.8 OWNER'S Right to Audit:

- **17.8.1** Records means all records generated by or on behalf of CONTRACTOR and each Subcontractor and Supplier of CONTRACTOR, whether paper, electronic, or other media, which are in any way related to performance of or compliance with this Contract, including, without limitation:
  - .1 accounting records;
  - .2 written policies and procedures;
  - .3 subcontract files (including proposals of successful and unsuccessful Bidders, Bid recaps, etc.);
  - .4 original estimates and estimating work sheets;
  - **.5** correspondence;
  - .6 Change Order files (including documentation covering negotiated settlements);
  - .7 back charge logs and supporting documentation;
  - **.8** general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends;
  - .9 lump sum agreements between CONTRACTOR and any Subcontractor or Supplier;
  - .10 records necessary to evaluate: Contract compliance, Change Order pricing, and any Claim submitted by CONTRACTOR or any of its payees; and
  - **.11** any other CONTRACTOR record that may substantiate any charge related to this Contract.
- 17.8.2 CONTRACTOR shall allow OWNER'S agent or its authorized representative to inspect, audit, and/or reproduce, or all three, all Records generated by or on behalf of CONTRACTOR and each Subcontractor and Supplier, upon OWNER'S written request. Further, CONTRACTOR shall allow OWNER'S agent or authorized representative to interview any of CONTRACTOR'S employees, all Subcontractors and all Suppliers, and all their respective employees.
- 17.8.3 CONTRACTOR shall retain all its Records, and require all its Subcontractors and Suppliers to retain their respective Records, during this Contract and for three (3) years after final payment, until all audit and litigation matters that OWNER has brought to the attention of CONTRACTOR are resolved, or as otherwise required by law, whichever is longer. OWNER'S right to inspect, audit, or reproduce Records, or interview employees of CONTRACTOR or its respective Subcontractors or Suppliers exists during this Contract, and for three (3) years after final payment, until all audit and litigation matters that OWNER has brought to CONTRACTOR'S attention are resolved, or as otherwise required by law, whichever is longer, and at

- no cost to OWNER, either from CONTRACTOR or any of its Subcontractors or Suppliers that may furnish Records or make employees available for interviewing.
- **17.8.4** CONTRACTOR must provide sufficient and accessible facilities during its normal business hours for OWNER to inspect, audit, or reproduce Records, or all three, and to interview any person about the Records.
- **17.8.5** CONTRACTOR shall insert these requirements in each written contract between CONTRACTOR and any Subcontractor or Supplier and require each Subcontractor and Supplier to comply with these provisions.
- **17.9 Survival:** The terms and conditions of this Contract, which contemplate a period of time beyond completion or termination will survive such completion or termination and not be merged therein or otherwise terminated.
- **17.10 No Waiver:** The waiver of any provision of this Contract will not be deemed to be a waiver of any other provision of this Contract. No waiver of any provision of this Contract will be deemed to constitute a continuing waiver unless expressly provided in writing, nor will a waiver of any default be deemed a waiver of any subsequent defaults of the same type. The failure at any time to enforce this Contract, whether the default is known or not, shall not constitute a waiver or estoppel of the right to do so.
- **17.11 Conditions Precedent to Right to Sue:** Notwithstanding anything herein to the contrary, the CONTRACTOR will have at least 90 days to give notice of a claim for damages as a condition precedent to the right to sue on the Contract, subject to the contractual claim and alternative dispute resolution processes set forth herein.
- **17.12 Waiver of Trial by Jury:** OWNER and CONTRACTOR agree that they have knowingly waived the right to trial by jury and have instead agreed that, in the event of any litigation arising out of or connected to this Contract, to proceed with a trial before the court, unless both parties subsequently agree otherwise in writing.
- **17.13 Contractor Evaluation:** The Owner will review and evaluate the Contractor's Work and performance on the Project and provide the Contractor with a written Contractor Evaluation Report in accordance with City of Austin Administrative Rule R161-13.37. Rule R161-13.37 provides an appeal process.

http://www.austintexas.gov/department/contract-management

End

The Supplemental General Conditions contained herein amend or supplement the General Conditions, Section 00700.

## **ARTICLE 1 - DEFINITIONS**

Add to the following definition:

**1.20** Engineer/Architect (E/A): The OWNER's design professional for this contract is:

Name: Rubén López, Jr., P.E.

Address: 505 Barton Springs Road, 9th Floor, Austin, TX 78704

## Add the following definitions:

- **1.51** Allowance Allowance is defined as "a not-to-be-exceeded amount", either individually or in the aggregate, which is established between the Owner and the Contractor as part of its Bid Proposal when the precise scope of a particular line item(s) has not been defined to a level which is adequate for the Contractor to provide a definitive line item pricing for that particular scope of Work. The use of any Allowances by the Contractor will be subject to the Owner's sole approval and it is the Owner's intent to minimize the use of Allowances to the fullest extent possible. For any Allowances which the Owner allows the Contractor to use, the following rules shall apply: (i) Allowances shall cover the cost to the Contractor of the Cost of Work; (ii) Contractor's overhead and profit associated with the stated Allowance shall be included in the Allowance; and (iii) upon completion of the Portion of the Work subject to an Allowance, the Contract Amount for that portion of the Work will be adjusted based upon the approved actual cost of the Work, which will not exceed the approved aggregate amount of the Allowances.
- **1.52** <u>Mobilization Prompt Payment Program</u> The Owner's Mobilization Prompt Payment Program, will allow bimonthly payments during "critical mobilization stages" as specified in the Contract Documents by the Prime Contractor. The Mobilization Prompt Payment Program will only apply to projects with a construction cost greater than \$2,000,000.

#### **ARTICLE 2 - PRELIMINARY MATTERS**

Add the following modification to the end of 2.4.2.1:

.1 The Baseline Schedule and schedule submittals for Projects in the Mobilization Prompt Payment Program must identify periods of 'critical mobilization.' The periods of critical mobilization will include the first two months of the Contract Time and additional periods identified by the Contractor and approved by Owner when peak Subcontractor mobilization will occur.

#### **ARTICLE 5 - BONDS AND INSURANCE**

- **5.3 Other Bond and Insurance Requirements:**
- **5.3.1** CONTRACTOR Provided Insurance

## **5.3.1.1** General Requirements.

- .1 CONTRACTOR shall carry insurance in the types and amounts indicated below for the duration of the Contract, which shall include items owned by OWNER in the care, custody and control of CONTRACTOR prior to and during construction and warranty period.
- .2 CONTRACTOR must complete and forward the Certificate of Insurance, Section 00650, to OWNER before the Contract is executed as verification of coverage required below. CONTRACTOR shall not commence Work until the required insurance is obtained and until such insurance has been reviewed by OWNER. Approval of insurance by OWNER shall not relieve or decrease the liability of CONTRACTOR hereunder and shall not be construed to be a limitation of liability on the part of CONTRACTOR. CONTRACTOR must also complete and forward the Certificate of Insurance, Section 00650, to OWNER whenever a previously identified policy period has expired as verification of continuing coverage.
- .3 CONTRACTOR's insurance coverage is to be written by companies authorized to do business in the State of Texas at the time the policies are issued and shall be written by companies with A.M. Best ratings of B+VII or better, except for hazardous material insurance which shall be written by companies with A.M. Best ratings of A- or better.
- .4 All endorsements naming the OWNER as additional insured, waivers, and notices of cancellation endorsements as well as the Certificate of Insurance shall indicate: City of Austin, Capital Contracting Office, P.O. Box 1088, Austin, Texas 78767.
- .5 The "other" insurance clause shall not apply to the OWNER where the OWNER is an additional insured shown on any policy. It is intended that policies required in the Contract, covering both OWNER and CONTRACTOR, shall be considered primary coverage as applicable.
- **.6** If insurance policies are not written for amounts specified below, CONTRACTOR shall carry Umbrella or Excess Liability Insurance for any differences in amounts specified. If Excess Liability Insurance is provided, it shall follow the form of the primary coverage.
- .7 OWNER shall be entitled, upon request and without expense, to receive certified copies of policies and endorsements thereto and may make any reasonable requests for deletion or revision or modification of particular policy terms, conditions, limitations, or exclusions except where policy provisions are established by law or regulations binding upon either of the parties hereto or the underwriter on any such policies.
- **.8** OWNER reserves the right to review the insurance requirements set forth during the effective period of this Contract and to make reasonable adjustments to insurance coverage, limits, and exclusions when deemed necessary and prudent by OWNER based upon changes in statutory law, court decisions, the claims history of the industry or financial condition of the insurance company as well as CONTRACTOR.
- **.9** CONTRACTOR shall not cause any insurance to be canceled nor permit any insurance to lapse during the term of the Contract or as required in the Contract.
- **.10** CONTRACTOR shall be responsible for premiums, deductibles and self-insured retentions, if any, stated in policies. All deductibles or self-insured retentions shall be disclosed on the Certificate of Insurance.
- **.11** CONTRACTOR shall provide OWNER thirty (30) days written notice of erosion of the aggregate limits below occurrence limits for all applicable coverages indicated within the Contract.

- **.12** If OWNER owned property is being transported or stored off-site by CONTRACTOR, then the appropriate property policy will be endorsed for transit and storage in an amount sufficient to protect OWNER's property.
- **.13** The insurance coverages required under this contract are required minimums and are not intended to limit the responsibility or liability of CONTRACTOR.
- **5.3.1.2** Business Automobile Liability Insurance. Provide coverage for all owned, non-owned and hired vehicles. The policy shall contain the following endorsements in favor of OWNER:
  - a) Waiver of Subrogation endorsement CA 0444;
  - b) 30 day Notice of Cancellation endorsement CA 0244; and
  - c) Additional Insured endorsement CA 2048.

Provide coverage in the following types and amounts:

- **.1** A minimum combined single limit of \$1,000,000 minimum per occurrence for bodily injury and property damage.
- **5.3.1.3** Workers' Compensation And Employers' Liability Insurance. Coverage shall be consistent with statutory benefits outlined in the Texas Workers' Compensation Act (Section 401). CONTRACTOR shall assure compliance with this Statute by submitting two (2) copies of a standard certificate of coverage (e.g. ACCORD form) to Owner's Representative for every person providing services on the Project as acceptable proof of coverage. The Certificate of Insurance, Section 00650, must be presented as evidence of coverage for CONTRACTOR. CONTRACTOR's policy shall apply to the State of Texas and include these endorsements in favor of OWNER:
  - a) Waiver of Subrogation, form WC 420304; and
  - b) 30 day Notice of Cancellation, form WC 420601.

The minimum policy limits for Employers' Liability Insurance coverage shall be as follows:

- **.1** \$100,000 bodily injury per accident, \$500,000 bodily injury by disease policy limit and \$100,000 bodily injury by disease each employee.
- **5.3.1.4** Commercial General Liability Insurance. The Policy shall contain the following provisions:
  - a) Contractual liability coverage for liability assumed under the Contract and all contracts relative to this Project.
  - b) Completed Operations/Products Liability for the duration of the warranty period.
  - c) Explosion, Collapse and Underground (X, C & U) coverage.
  - d) Independent Contractors coverage (Contractors/ Subcontractors work).
  - e) Aggregate limits of insurance per project, endorsement CG 2503.
  - f) OWNER listed as an additional insured, endorsements CG 2010 and CG 2037 or equivalent.
  - g) 30 day notice of cancellation in favor of OWNER, endorsement CG 0205.
  - h) Waiver of Transfer of Recovery Against Others in favor of OWNER, endorsement CG 2404.

Provide coverages A&B with minimum limits as follows:

**.1** A combined bodily injury and property damage limit of \$1,000,000 minimum\$ per occurrence.

#### **5.3.1.5** Hazardous Materials Insurance.

For Work which involves asbestos or any hazardous materials or pollution defined as asbestos, CONTRACTOR or Subcontractor responsible for the Work shall comply with the following insurance requirements in addition to those specified above:

- .1 Provide an asbestos abatement endorsement to the Commercial General Liability policy with minimum bodily injury and property damage limits of \$1,000,000 per occurrence for coverages A&B and products/completed operations coverage with a separate aggregate of \$1,000,000. This policy shall not exclude asbestos or any hazardous materials or pollution defined as asbestos and shall provide "occurrence" coverage without a sunset clause. The policy shall provide 30 day Notice of Cancellation and Waiver of Subrogation endorsements in favor of OWNER.
- hazardous materials defined as asbestos shall provide pollution coverage. Federal law requires interstate or intrastate transporters of asbestos to provide an MCS 90 endorsement with a \$5,000,000 limit when transporting asbestos in bulk in conveyances of gross vehicle weight rating of 10,000 pounds or more. Interstate transporters of asbestos in non-bulk in conveyances of gross vehicle weight rating of 10,000 pounds or more must provide an MCS 90 endorsement with a \$1,000,000 limit. The terms "conveyance" and "bulk" are defined by Title 49 CFR 171.8. All other transporters of asbestos shall provide either an MCS 90 endorsement with minimum limits of \$1,000,000 or an endorsement to their Commercial General Liability Insurance policy which provides coverage for bodily injury and property damage arising out of the transportation of asbestos. The endorsement shall, at a minimum, provide a \$1,000,000 limit of liability and cover events caused by the hazardous properties of airborne asbestos arising from fire, wind, hail, lightning, overturn of conveyance, collision with other vehicles or objects, and loading and unloading of conveyances.
- **.3** CONTRACTOR shall submit complete copies of the policy providing pollution liability coverage to OWNER.
- **5.3.1.6** Professional Liability Insurance. For Work which requires professional engineering or professional survey services to meet the requirements of the Contract, including but not limited to excavation safety systems, traffic control plans, and construction surveying, the CONTRACTOR or Subcontractors, responsible for performing the professional services shall provide Professional Liability Insurance with a minimum limit of \$500,000 per claim and in the aggregate to pay on behalf of the assured all sums which the assured shall become legally obligated to pay as damages by reason of any negligent act, error, or omission committed with respect to all professional services provided in due course of the Work of this Contract. CONTRACTOR's policy shall include the following endorsement in favor of the OWNER:
  - a) 30 day Notice of Cancellation endorsement CA 0244

#### **ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES**

**6.6 Permits, Fees:** *Add the following*:

OWNER will obtain and pay for the following permits, licenses and/or fees:

#### **6.6.1** General Permit.

## **6.7** Laws and Regulations: Add the following:

**6.7.4** This Work is subject to the Texas Pollution Discharge Elimination System (TPDES) permitting requirements for the installation and maintenance of temporary and permanent erosion and sediment controls and storm water pollution prevention measures throughout the construction period.

OWNER has prepared a Storm Water Pollution Prevention Plan (SWPPP). Reference Section 01096 for this SWPPP.

CONTRACTOR's responsibilities are as follows:

- .1 Obtain a signed certification statement from all Subcontractors responsible for implementing the erosion / sedimentation controls and other best management practices that are part of the SWPPP. This statement shall indicate that the Subcontractor understands the permit requirements. The certified statement forms shall be attached to and become part of the SWPPP.
- .2 Fill out the TCEQ's "Construction Site Notice" form, which is Attachment 2 to the TPDES General Permit TXR150000 (form available from OWNER or on the Internet at <a href="http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stormwater/txr152d2.pdf">http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attachments/stormwater/txr152d2.pdf</a> and post it near the main entrance of the Work, or at multiple postings if the Work is linear. Mail a copy of the completed Construction Site Notice form to the local Municipal Separate Storm Sewer Systems (MS4) representative:

TPDES Program Coordinator City of Austin – WPD – ERM P.O. Box 1088 Austin, TX 78767

- **.3** Maintain all erosion/sedimentation controls and other protective measures identified in the SWPPP in effective operating condition.
- .4 Perform inspections every five (5) working days and after every ½ inch rainfall event, noting the following observations on an inspection form provided by OWNER:
  - a) Locations of discharges of sediment or other pollutants from the site.
  - b) Locations of storm water / erosion / sedimentation controls that are in need of maintenance.
  - c) Locations of storm water / erosion / sedimentation controls that are not performing, failing to operate, or are inadequate.
  - d) Locations where additional storm water / erosion / sedimentation controls are needed.
- **.5** Maintain at Work site at all times a copy of the SWPPP (with all updates, as described below) and inspection reports.
- .6 Update the SWPPP as necessary to comply with TPDES permitting requirements, which includes noting changes in erosion / sedimentation controls and other best management practices that are part of the SWPPP and which may be necessary due to the results of inspection reports. Any SWPPP revisions or updates must be signed and certified by a Certified Professional in Erosion and Sedimentation Control (CPESC) or a Registered

Professional Engineer. If the SWPPP includes engineering calculations, then SWPPP must be sealed and signed by a Registered Professional Engineer.

.7 Upon completion of the Work, provide TPDES records to OWNER.

# ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

# **13.7 Warranty Period:** *Add the following:*

**13.7.5** OWNER will utilize a "Warranty Item Form" (attached at the end of this Section) for the purpose of providing Written Notice of warranty defects to CONTRACTOR. CONTRACTOR shall date, sign, complete and return the form to OWNER when the defect is corrected, including such information on or attached to the form to describe the nature of the repairs or corrections that were made. If the defect cannot be corrected in seven (7) Calendar Days, CONTRACTOR shall provide a written explanation to the Owner's Representative describing the repairs needed and the time required to complete the repairs.

# **ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION**

- **14.1 Application for Progress Payment:** <u>Delete 14.1.1 and replace with the following (changes to the original text are identified by underlining)</u>:
- **14.1.1** No more often than once a month, <u>unless authorized as part of the Mobilization Prompt Payment Program,</u> CONTRACTOR shall submit to Owner's Representative for review a completed and executed Application for Payment, in a form acceptable to OWNER, covering the Work completed as of the date of the Application and not previously paid and accompanied by such supporting documentation as required by the Contract Documents.

## Add the following paragraph to 14.1.1:

.1 Mobilization Prompt Payment Program. During critical mobilization periods, as identified by the CONTRACTOR and as approved by OWNER in accordance with 00700 2.4.2.1 of this Contract, CONTRACTOR shall submit bi-monthly Applications for Payment. The additional Pay Applications will include any costs accrued during the periods of critical mobilization. The Program will allow the CONTRACTOR and Subcontractors to invoice for costs as they are accrued during periods of critical mobilization. The CONTRACTOR shall submit bimonthly invoices to the OWNER for such costs. The CONTRACTOR shall pay Subcontractors for costs within 10 days of receipt of payment from OWNER.

## **14.1** Application for Progress Payment: <u>Delete 14.1.6.3 and replace with the following:</u>

- **.3** Contract time statement form signed by CONTRACTOR and Owner's Representative. If CONTRACTOR does not agree with the number of accumulated days charged, CONTRACTOR shall file a Claim in accordance with Article 16.1, Filing of Claims.
- **14.7 Substantial Completion:** <u>Reference 14.7.1, and one of the following three</u> provisions:
- **14.7.1.1** For water and wastewater lines construction, Substantial Completion means that the Work, including all testing and disinfection, has been completed and accepted and the line(s) placed into service. A certificate of Substantial Completion will not be issued. Work that remains after Substantial Completion could include the final pavement of roadways, adjustment of structures to final grade and revegetation. Owner's

Representative will issue a notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted as Substantially Complete. This subsection 14.7.1.1 changes the 00700 General Conditions definition of Substantial Completion.

# **14.8 Partial Utilization:** <u>Delete 14.8.1 and replace with the following (changes to the original text are identified by underlining):</u>

**14.8.1** OWNER at any time may request CONTRACTOR to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to Owner's Representative that such part of the Work is substantially complete and request Owner's Representative to issue a <u>notice specifying what portion of the Work is substantially complete for the purpose of payment and what Work remains to be done on the portion being accepted. CONTRACTOR at any time may notify Owner's Representative that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request Owner's Representative to issue a notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted. The provisions of paragraphs 14.7.1 and 14.7.2 will apply with respect to <u>the notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted."</u></u>

# **14.10** Final Application for Payment: *Add the following paragraph(s) to 14.10*:

**14.10.10** TPDES records in accordance with 6.7.4.

# **14.11 Final Payment and Acceptance:** Add the following to paragraph 14.11.1:

If the sole remaining, unfinished item of the Work is revegetation or other permanent erosion control, including, if applicable, tree mitigation, (collectively, the "revegetation"), the CONTRACTOR may execute a zero-cost "Revegetation Change Order" for such Work and post fiscal security acceptable to Owner to ensure completion of the revegetation.

The fiscal security will be a bond, letter of credit, or cash escrow in a form promulgated by OWNER and posted with OWNER's Watershed Protection Department.

Upon receipt of the executed Revegetation Change Order and fiscal security, the Owner's Representative will issue a conditional letter of final acceptance to the CONTRACTOR for the Work, excluding the revegetation, which establishes the Final Completion Date for that Work and initiates the one year warranty period.

This revegetation must be accomplished within 120 Calendar Days of the date of Final Completion of the balance of the Work or such other stipulated time for completion directed in the Change Order. When the revegetation has been established, OWNER will inspect for final acceptance of that portion of the Work and, as applicable, initiate the one year warranty period for that Work.

If the revegetation is not completed within 120 Calendar Days or such other time set forth in the Change Order, the OWNER, at its option, may complete the Work using the posted fiscal security.

WARRANTY ITEM NO (PROJECT NAME)		
The General Conditions of the Contract require that Warranty Defects be corrected within 7 days after written notice is received.		
TO:		
contractor name address / telephone / fax / email		
ATTENTION OF:		
FROM:		
project manager name / address / telephone / fax / email		
PROJECT:		
name / location / CIP ID number		
END OF ONE YEAR WARRANTY:		
SUBJECT:  [ ] If checked, the damage requires immediate attention. The Contractor has I [ ] If checked, the Consultant has been asked to consult with the Contractor problem.		
PLEASE CORRECT OR REPAIR THE FOLLOWING ITEM(S):		
DATE OF REQUEST SIGNATURE		
Project Ma	anager	
[ ]Phone No		
[ ]Phone No [ ]Phone No		
[ ]Phone No		
DECRONCE FROM CONTRACTOR: DATE CORRECTION WAS MADE.		
RESPONSE FROM CONTRACTOR: DATE CORRECTION WAS MADE:		
The Contractor must endeavor to correct the defect within 7 calendar days a notice is given. If the defect cannot be corrected in that time, Contractor sha written explanation to the Owner's Representative describing the repairs need time required to complete the repairs.	III provide a	
Description of corrections made:		
DATE OF REPLYSIGNATURE		
When the repair is complete, the contractor should return a copy to each of the f  [ ]Phone No	_	
[ ]Phone No		
[ ]Phone No		
[ ]Phone No		

**END** 

#### WAGE RATES AND PAYROLL REPORTING

Section 00830

#### 1. PAYMENT

- **1.1** Classification Definitions, Building and Heavy and Highway
- **1.1.1** Definitions for Building Construction and Heavy and Highway classifications shall conform to the current "Occupational Information Network (O\*NET)" as approved by the U.S. Department of Labor. For interpretive guidance, the Core Task list in O\*NET will be used to make prevailing wage determinations. Final classification of workers will be made by the OWNER.

## **1.2** Minimum Wages

- **1.2.1** Workers on Project shall be paid not less than wage rates, including fringe benefits, as published by the Department of Labor (DOL) or the \$15.00 minimum wage required by City of Austin Ordinance No. 20160324-015, whichever is higher. The Total Minimum Wage required can be met using any combination of cash and non-cash qualified fringe benefits provided the cash component meets or exceeds the \$15.00 minimum wage required.
- **1.2.2** Such wage rates shall be used throughout the Contract. If a classification is to be used, which is not listed in the attached wage rates, CONTRACTOR shall submit to OWNER rates and classification proposed for use, for approval, prior to performance of the Work.
- 1.2.3 All laborers and mechanics working upon the Work for this Project shall be paid unconditionally and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by Secretary of Labor under the Copeland Act, Title 29 CFR, Part 3) full wages accrued and when due, computed at rates not less than wage rates bound herein pertaining to type of Work being performed. When Work is of such a nature that both Building and Heavy and Highway wage scales are incorporated into contract, CONTRACTOR shall pay wage rates to mechanics or laborers performing Work in more than one classification at the rate indicated for each classification for time actually worked as determined by area practice applicable to type (Site Construction Crafts or Building Construction Crafts) of Work being performed without regards to skill. Salaried specialists (project superintendent and administrative personnel only) in the permanent employment of CONTRACTOR do not fall under any Wage Classification. A supervisor/foreman who is not exempt under 29 CFR Part 541 and who spends more than a substantial amount of time (20 percent) in a given workweek as a laborer or mechanic must be paid the applicable Wage Rate for the classification of work performed for all hours engaged in such work as a laborer or mechanic.
- **1.2.4** Wage rates shall be posted by CONTRACTOR at site(s) of Work in prominent, easily accessible places where they can be seen by all workers. The following shall also be posted by the CONTRACTOR: City of Austin wage contact posters (English and Spanish), City of Austin Equal Employment Opportunity posters (English and Spanish), Workers' Compensation Notice (English and Spanish), Texas Payday Law (English and Spanish), City Rest Break Ordinance

(English and Spanish), City of Austin Non-Discrimination Statement (related to Title VI of the Civil Rights Act), and Federal Notices, as appropriate.

# **1.3** Overtime Requirements

- **1.3.1** No CONTRACTOR, Subcontractor, or Sub-subcontractor contracting for any part of contract Work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he is employed on such Work, to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times their basic rate of pay for all hours in excess of forty hours in such workweek.
- **1.3.2** Overtime wages must be calculated using the Adjusted Wage Rate specified in the Wage Rate Determination or the actual basic rate of pay, whichever is higher.

#### 2. APPRENTICES

- **2.1** Locally and Federally Funded Projects
- **2.1.1** The terms journeyman and apprentice apply to both union and independent workers, and are not intended to imply that these positions are union workers only.
- **2.1.2** Apprentices and Trainees will be permitted to work as such only when they are registered, individually, under a bonafide Apprenticeship or Trainee program registered with the Bureau of Apprenticeship and Training, United States Department of Labor. The allowable ratio of Apprentices or Trainees to journeymen in any craft classification shall not be greater than the ratio permitted to CONTRACTOR as stated in the registered apprenticeship program standards. Any employee listed on a payroll at an Apprentice or Trainee wage rate, who is not registered as above, shall be paid the wage rate provided in Contract for Work employee actually performed. CONTRACTOR, Subcontractor, or Subsubcontractor shall furnish to OWNER written evidence of registration of his program for Apprentices and Trainees as well as of the appropriate ratios and wage rates, for the area of construction prior to using any Apprentices or Trainees on this Contract.

## 3. WITHHOLDING PAYMENTS

**3.1** OWNER may withhold or cause to be withheld from CONTRACTOR as much of the accrued payments as necessary to pay laborers and mechanics employed by CONTRACTOR, Subcontractors, or Sub-subcontractors the amount of wages required to comply with the Contract. In the event of nonpayment of wages to laborers or mechanics working on the site of the Work of this Contract, OWNER may, after Written Notice to CONTRACTOR, take such action as may be necessary to cause suspension of any further payments or advance of funds to CONTRACTOR until such violations have ceased and until restitution has been made. Payments may also be withheld if CONTRACTOR fails to maintain weekly payroll reports or fails to provide copies in a timely manner upon request of Owner.

## 4. PAYROLLS

**4.1** CONTRACTOR shall keep records showing:

- **4.1.1** The name, address and occupation of each worker employed by the CONTRACTOR or subcontractor(s) in the construction of the public work.
  - **4.1.2** The actual per diem wages paid to each worker
- **4.1.3** Employee Certification. CONTRACTOR, all levels of Subcontractors shall identify in writing, the classification agreed to by all laborers and mechanics employed by them in the execution of the Contract, and pay not less than rates specified in the attached Wage Rate Determination(s). Contractor shall prepare a completed form for the signature of Employee and a witness shall sign the form in the presence of Employee. If work performed by worker is different than the trade classification agreed upon, the worker shall be paid for that work no less than the minimum prevailing wage for that specified trade.
- **4.1.4** Payroll Deduction Authorization Form. CONTRACTOR, Subcontractor, and Sub subcontractor shall prepare for employee signature a payroll deduction authorization form to identify all payroll deductions excluding those required by statute, such as federal income taxes, Medicare and social security.
- **4.2** The record shall be open at all reasonable hours to inspection by the officers and agents of the Owner as requested. CONTRACTOR will be responsible to provide copies of records as requested by the Owner within two (2) working days. Payrolls relating to this Work shall be maintained during term of Contract and preserved for a period of three (3) years thereafter by CONTRACTOR for all laborers and mechanics working on the Work.
- **4.3** A Statement of Compliance, a letter signed and dated by party responsible for supervising the payment of persons employed by CONTRACTOR or subcontractor shall accompany payrolls required by Owner. The Statement of Compliance letter shall identify but is not limited to:
  - **4.3.1** Name of signatory party and title
  - **4.3.2** Name of project, payroll period and
  - **4.3.3** Name of CONTRACTOR or Subcontractor
- **4.4** The signed letter attests that the payroll complies with 29CFR issued by the Secretary of Labor.
- **4.5** Federal Funding. In the event that federal funding is used:
- **4.5.1** Contractor and all levels of Subcontractors shall submit weekly certified payroll reports and signed wage compliance statements to the Owner's designated office no later than seven (7) calendar days after the scheduled payday.
- **4.5.2** Contractors and all levels of Subcontractors shall pay all "mechanics and laborers" not less often than once per week, for work performed the previous week.
- **4.5.3** Submit to the Owner's designated office Standard Form 1413, Statement and Acknowledgement, from each subcontractor prior to the subcontractor performing work on the project.

#### 5. **NONCOMPLIANCE**

- **5.1** According to Chapter 2258 Texas Government Code Title 10A, a CONTRACTOR or subcontractor(s) who violates this section shall pay to the political subdivision on whose behalf the contract is made, \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.
- **5.2** Confirmed Disciplinary action taken by CONTRACTOR against employees who provide information during an interview or investigation by the Owner on wages received, may result in suspension or debarment from consideration of award of City contracts.

## 6. AREA PRACTICE

- **6.1** Heavy and Highway Construction Rates shall be used on this Project, unless the Project consists primarily of Building Construction and Building Construction Rates are to be used.
- **6.1.1** Building Construction consists generally of all aspects of construction of buildings, which are sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment or supplies, including without limitation the installation of utilities and equipment, both above and below grade level, as well as incidental demolition, grading, utilities, paving and other site work. Buildings need not be "habitable" to be classified as Building Construction and the installation of heavy machinery and/or equipment will not generally change a Building Construction project's classification.
- **6.1.2** The determination of Building Construction Wage Rates includes all construction trades and work necessary to complete a building, regardless of the number of contracts involved, so long as all such contracts are closely related in purpose, time and place.
- **6.2** For projects that involve both Building Construction and Heavy and Highway trades, the following classifications shall be used:
- **6.2.1** A multiple classification shall be used if Building Construction items are more than 20% of the Heavy and Highway project cost.
- **6.2.2** A multiple classification shall be used if Heavy and Highway Construction items are more than 20% of the Building Construction Project cost.
- **6.3** Split classifications/multiple wage rate schedules: When construction work requires that an employee perform work under multiple classifications or multiple wage scales, the employer must pay that worker (at least) the highest prevailing wage or the employer payroll records must accurately set forth the times spent performing the work of each classification and under each scale. For those projects that involve both Building Construction and Heavy and Highway trades, the Heavy and Highway wage rates may only be applied to workers when engaged in site work at least five (5) feet beyond the building.

## 7. TEXAS OPEN RECORDS ACT

**7.1** Unless covered by an exception to mandatory disclosure under the Texas Public Information Act, Chapter 552, Texas Government Code, any and all documents submitted to the City of Austin become Public Records and are, therefore, subject to public disclosure.

# **Wage Rates for This Project Are Attached**

**END** 

Section 00830HH

#### WAGE RATE DETERMINATION

**Heavy and Highway** County Name: TRAVIS

Wages based on DOL General Decision: TX20200007 01/01/2021 TX19 and City of Austin

Ordinance #20160324-015

DOL Rate column is for information only. The Total Minimum Wage Rate is derived from the Adjusted Wage Rate Required pursuant to City Ordinance, and can be met using any combination of cash and non-cash qualified fringe benefits, provided the cash component is at least \$15.00/hour.

Classification	DOL Rate For info Only	Adjusted Wage Rate Required Pursuant to City Ordinance	Total Minimum Wage Rate Required
Agricultural Tractor Operator	\$12.69	\$15.00	\$15.00
Asphalt Distributor Operator	\$15.55	\$15.55	\$15.55
Asphalt Paving Machine Operator	\$14.36	\$15.00	\$15.00
Asphalt Raker	\$12.12	\$15.00	\$15.00
Boom Truck Operator	\$18.36	\$18.36	\$18.36
Broom or Sweeper Operator	\$11.04	\$15.00	\$15.00
Cement Mason/Concrete Finisher	\$12.56	\$15.00	\$15.00
Concrete Pavement Finishing Machine Operator	\$15.48	\$15.48	\$15.48
Crane, Hydraulic, 80 tons or less	\$18.36	\$18.36	\$18.36
Crane, Lattice Boom, 80 tons or less	\$15.87	\$15.87	\$15.87
Crane, Lattice Boom, over 80 tons	\$19.38	\$19.38	\$19.38
Crawler Tractor	\$15.67	\$15.67	\$15.67
Directional Drilling Locator	\$11.67	\$15.00	\$15.00
Directional Drilling Operator	\$17.24	\$17.24	\$17.24
Electrician	\$26.35	\$26.35	\$26.35
Excavator 50,000 lbs. or less	\$12.88	\$15.00	\$15.00
Excavator, over 50,000 lbs.	\$17.71	\$17.71	\$17.71
Flagger	\$10.60	\$15.00	\$15.00
Form Builder/Form Setter - Paving & Curb	\$12.94	\$15.00	\$15.00
Form Builder/Form Setter - Structures	\$12.87	\$15.00	\$15.00
Foundation Drill Operator, Truck Mounted	\$16.93	\$16.93	\$16.93
Front End Loader Operator, 3CY or less	\$13.04	\$15.00	\$15.00
Front End Loader, over 3CY	\$13.21	\$15.00	\$15.00

Laborer Common	\$10.60	\$15.00	\$15.00
Laborer, Common	· ·	·	·
Laborer, Utility	\$12.27	\$15.00	\$15.00
Loader/Backhoe Operator	\$14.12	\$15.00	\$15.00
Mechanic	\$17.10	\$17.10	\$17.10
Milling Machine	\$14.18	\$15.00	\$15.00
Motor Grader Operator - Fine Grade	\$18.51	\$18.51	\$18.51
Motor Grader Operator, Rough	\$14.63	\$15.00	\$15.00
Painter - Structures	\$18.34	\$18.34	\$18.34
Pavement Marking Machine Operator	\$19.17	\$19.17	\$19.17
Pipelayer	\$12.79	\$15.00	\$15.00
Reclaimer/Pulverizer	\$12.88	\$15.00	\$15.00
Reinforcing Steel Setter	\$14.00	\$15.00	\$15.00
Roller Operator, Asphalt	\$12.78	\$15.00	\$15.00
Roller Operator, Other	\$10.60	\$15.00	\$15.00
Scraper Operator	\$12.27	\$15.00	\$15.00
Servicer	\$14.51	\$15.00	\$15.00
Spreader Box Operator	\$14.04	\$15.00	\$15.00
Structural Steel Worker	\$19.29	\$19.29	\$19.29
Traffic Signal Installer/Light Pole Worker	\$16.00	\$16.00	\$16.00
Trenching Machine Operator, Heavy	\$18.48	\$18.48	\$18.48
Truck Driver Tandem Axle Semi-Trailer	\$12.81	\$15.00	\$15.00
Truck Driver, Lowboy/Float	\$15.66	\$15.66	\$15.66
Truck Driver, Single Axle	\$11.79	\$15.00	\$15.00
Truck Driver, Off Road Hauler	\$11.88	\$15.00	\$15.00
Truck Driver, Single or Tandem Axle Dump	\$11.68	\$15.00	\$15.00
*Welders	\$15.97	\$15.97	\$15.97
Work Zone Barricade Servicer	\$11.85	\$15.00	\$15.00

The Wage Compliance information detailed below was excerpted from DOL General Decision TX170016 or other sources.

#### 1. ADDITIONAL TRADE INFORMATION

Unlisted classifications needed for work not listed within the scope of the classifications listed may be added upon the advance approval of Contract Procurement. CONTRACTOR shall submit to City of Austin Contract Procurement the following: classification, a bona fide definition of work to be performed and a proposed wage with sample payrolls conforming to area practice **prior** to the start of the job for that type of work. Proposed trade may not be performed by any trade already listed.

#### 2. WAGES

The Total Minimum Wage Rate may be met by any combination of cash wages and credible "bona fide" fringe benefits paid for by the employer. Overtime must be used in computing overtime pay. Wages must be calculated using the Total Minimum Wage Rate specified in the Wage Rate Determination or the actual basic rate of pay, whichever is higher.

City of Austin Ordinance No. 2016324-015 requires that construction workers are paid a minimum Wage of at least \$15.00/hour. The cash portion of their compensation must meet or exceed this amount.

### 3. PROPER DESIGNATION OF TRADE

A work classification from the Prevailing Wage Poster for each worker must be made based on the actual type of work he/she performed on the job. In summary the work performed, not the "title" determines the correct worker classification and wage. Each worker must be paid no less than the adjusted wage rate on the wage decision for that classification **regardless** of his/her level of skill (exclusive of a bona fide apprentice currently registered in a DOL approved apprentice program - proof of individual registration must be supplied in advance to the City of Austin).

#### 4. SPLIT CLASSIFICATION

If a firm has employees that perform work in more than one classification, it can pay the adjusted wage rates specified for each classification ONLY if it maintains accurate time records showing the amount of time spent in each classification. If accurate time records are not maintained, these employees must be paid the highest adjusted wage rate of all the classifications of work performed by each worker. Accurate time records tracking how many hours a worker performed the work of one trade and then switched to another trade must be accounted for on a daily basis and reflected on Employer Certified Payroll accordingly.

\*WELDERS - Receive rate prescribed for craft performing operation to which welding is

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

#### 5. WAGE DETERMINATION APPEALS PROCESS

- **5.1** Has there been an initial decision in the matter? This can be:
  - **.1** An existing published wage determination
  - **.2** A survey underlying a wage determination
  - .3 A Wage and Hour Division letter setting forth a position on a wage determination

#### **Bidding Requirements, Contract Forms Conditions of the Contract**

matter

.4 A conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in .2 and .3 should be followed.

**5.2** With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determination Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

**5.3** If the answer to the question in **.1** is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

**5.4** If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

**5.5** All decisions by the Administrative Review Board are final.

**END** 

The **City of Austin Construction Training Program (the "Program")** is intended to train workers on City of Austin's construction projects in order to develop a pool of qualified, ready-to-work skilled and semi-skilled construction workers. This training commitment is not intended and shall not be used to discriminate against any applicant.

**Training Requirement.** Establishment of the Construction Training Requirement for each project will be based on project scope, dollar amount, and opportunities available to achieve the training requirements. The requirements will be established either prior to solicitation, or during contract negotiations, using the criteria in Charts A and B. Program requirements will be subject to availability of Trainees and Graduates.

#### **Chart A - Evaluation Criteria**

- 1. Material cost vs labor cost
- 2. Scope of work
- 3. Schedule of values (a comprehensive list of work for a particular project)
- 4. Project duration and schedule
- 5. Unique aspects of the project
- 6. Available training programs for the specific training plan
- 7. Workforce determined by the number of workers that will be on the project enough days to establish a training program.

Chart B – Construction Training Requirements					
Estimated Construction Cost Apprentice/ On-the-Job Training (OJT) /Construction					
	Ready (CR) Trainee Requirements				
\$500K to \$2.5M	2 – Construction Ready Trainees*				
Over \$2.5M to \$5M	4 - Construction Ready Trainees*				
Over \$5M to \$10M	6 - Construction Ready Trainees*				
Over \$10M (Significant Budget)	OJT/Apprentice/Graduate/Trainee Minimum 15%				

<sup>\*</sup>These requirements may also be satisfied by workers enrolled in or graduated from DOL registered/approved training programs.

#### 1. **DEFINITIONS**

- 1.1 Capital Contracting Office (CCO) The City of Austin's Office responsible for administering the Construction Training Program
- 1.2 City's Approved Minimum Wage Rate a minimum wage rate established by the City of Austin for workers performing construction activities on City of Austin contracts
- 1.3 Construction-Ready Trainee a graduate or current trainee of a Pipeline training program, enrollee or graduate of a DOL-registered Apprenticeship Program, enrollee or graduate of a DOL-approved Training Program, and/or an enrollee or graduate of a DOL-certified Bilingual Training Program.

- 1.4 *Pipeline* group of organizations that provide pre-employment, pre-apprentice, or apprentice readiness training related to construction
- 1.5 *Training Plan:* a plan identifying how a contractor intends to meet its training requirement, subject to OWNER's review and approval
- 1.6 Construction Training Program Reporting Form a form provided by the OWNER which documents the contractor's training activities and trainee status

#### 2. TRAINING REQUIREMENT

2.1 The Construction Ready Trainee requirement for this project is 6.

#### 3. CONTRACTOR'S RESPONSIBILITIES

- 3.1 No later than 10 business days after Council Award, the CONTRACTOR shall provide a Training Plan for OWNER's approval, specifying how the CONTRACTOR intends to satisfy the contract requirement. The CONTRACTOR will have fulfilled its responsibilities under Section 00840 of the contract by having complied with the CONTRACTOR's Training Plan approved by the OWNER.
- 3.2 In the event that a CONTRACTOR subcontracts a portion of the contract work, CONTRACTOR shall determine if the requirements of the program will be assumed by the subcontractor(s). The CONTRACTOR should ensure that this training provision is made applicable to such subcontract; however, the CONTRACTOR shall retain the responsibility for meeting the training requirements imposed by this provision.
- 3.3 Trainee must be paid at least the City's Approved Minimum Wage Rate.
- 3.4 OWNER will provide a list of available Pipeline organizations. The CONTRACTOR shall contact those Pipeline organizations as needed in order to recruit workers for the program.
- 3.5 The CONTRACTOR shall submit a Training Report to OWNER for each Trainee no later than 30 calendar days after the Notice-to-Proceed. This Training Report must be submitted monthly thereafter for the duration of the project. This shall indicate work classification and graduation details, as well as training status changes. If a trainee is terminated or resigns, the CONTRACTOR is required to make a reasonable effort to replace the trainee within 30 calendar days.
- 3.6 For each trainee performing work on the project, the CONTRACTOR must submit to CCO a completed Employee Certification Form for each Trainee.
- 3.7 CONTRACTOR's **Reasonable Efforts to Comply.** The CONTRACTOR will be responsible for demonstrating the steps taken to meet the trainee requirement. If CONTRACTOR has fewer trainees employed on the project than specified in the Training Plan, the CONTRACTOR must submit evidence of recruitment efforts, including:

# **Bidding Requirements, Contract Forms and Conditions of the Contract**

# **CONSTRUCTION TRAINING PROGRAM REQUIREMENTS**

Section 00840

- 3.7.1 contacts made to OWNER for a current list of approved training providers
- 3.7.2 log of applicants contacted
- 3.7.3 log of training organizations contacted
- 3.7.4 documented outreach efforts made to all available training organizations (per current OWNER list) to satisfy the requirement
- 3.7.5 documentation of CONTRACTOR's recruitment efforts performed until program requirements are met or project is complete as part of the Construction Training Program Reporting Form

#### 4. NON-COMPLIANCE

4.1 Lack of demonstrated reasonable effort to comply with the Construction Training Program will be reflected in the Contractor's Performance Evaluation and may impact the receipt of future business with the City of Austin.

**Notice to Bidders:** This form, Addendum, Section 00900, is included for your information only. If an actual Addendum is issued for this project, the format shown below will be used. Additionally, issued addenda will be bound at the beginning of the Project Manual following the Table of Contents at the time of contract execution.

ADDENDUM NO		
Date		
City of Austin		
Project Name		
C.I.P. No	IFB No.:	
dated, (first adv	vertisement date). Ackno	s or modifies original Bid Documents owledge receipt of this addendur subject bidder to disqualification.
A. Project Manual Revisions:		
B. Drawing Revisions:		
This addendum consists of	_ page(s)/sheet(s).	
Approved by OWNER		
Approved by ENGINEER/	/ARCHITECT (as applicab	le per license requirements)
END		

# **SPECIFICATIONS**

**Division 1 - General Requirements** 

The Work of this Contract includes sustainability requirements as shown in the Division 1 Sections 01352 and/or 01505 and all other applicable specification sections. It is the intent of the Owner to work in partnership with the Contractor in implementing sustainable construction practices to the greatest extent possible.

#### **PART 1 - GENERAL**

#### 1.1 Related Documents:

Drawings and general provisions of Contract, including General Conditions, Section 00700, and Supplemental General Conditions, Section 00810, and Division 1 requirements.

#### 1.2 DESCRIPTION OF WORK

#### 1.21 Scope of Work

- A. This section describes the Project in general and provides an overview of the extent of the Work to be performed by the CONTRACTOR. Detailed requirements and extent of Work is stated in the applicable Specification Sections and shown on the Drawings. CONTRACTOR shall, except as otherwise specifically stated herein or in any applicable part of these Contract Documents, provide and pay for all labor, materials, equipment, tools, construction equipment, and other facilities and services necessary for proper execution, testing, and completion of the Work.
- B. Any part or item of the Work which is reasonably implied or normally required to make the installation satisfactorily operable shall be performed by the CONTRACTOR and the expense thereof shall be included in the applicable unit prices or lump sum prices bid for the Work. It is the intent of these Specifications to provide the OWNER with the complete system. All miscellaneous appurtenances and other items of Work that are incidental to meeting the intent of the Specifications shall be considered as having been included in the applicable unit prices or lump sum prices bid for the Work even though these appurtenances and items may not be specifically called for in the Bid Documents.
- C. The Work shall include furnishing all tools, labor, materials, equipment, and miscellaneous items necessary for the complete construction of approximately 416 linear feet of 6" PVC, 7685 linear feet of 8" PVC, 586 linear feet of 12" PVC, 3955 linear feet of 16" PVC, 777 linear feet of 12" HDPE (Horizontal Directional Drilling), and 2883 linear feet of 20" HDPE (Horizontal Directional Drilling) water mains, two (2) Pressure Reducing Valve stations, one (1) Potable Water Pressure Point station, and appurtenances.

#### 1.22 Location of Project

A. The Project begins at Springdale Road and US 290 Frontage Road, continues on Springdale Road to Breeds Hill and the Walnut Trace subdivision on either side of Springdale Road, and continues on US 290 Frontage Road to Chimney Hill Blvd.. The project location/route is shown on the Drawings.

# 1.23 Contractor's Responsibilities

- A. Execute all Work, including excavation, installing pipe, backfill, miscellaneous concrete and testing. The Work of this Contract is specified in the City of Austin Standard Specifications, Special Provisions and Special Specifications listed in the Table of Contents.
- B. Secure all construction-related permits, other than those provided by OWNER as described in paragraph 6.6 of Section 00810, Supplemental General Conditions, and pay for the same.
- C. Arrange for the necessary temporary water and electric service and pay for these services and all water and electricity consumed during the construction Work.
  - D. Provide adequate temporary sanitary facilities.

#### 1.24 Easements and Rights-Of-Way

CONTRACTOR shall confine his construction operations within the limits indicated on the Drawings, and shall use due care in placing construction tools, equipment, excavated materials, and pipeline materials and supplies so as to cause the least possible damage to property and interference with traffic. If the CONTRACTOR requires additional easement for his operations, the CONTRACTOR is solely responsible for acquisition and maintenance of the easement. No additional compensation will be provided by the OWNER.

- **A. Easements -** Easements across private property are indicated on the Drawings. CONTRACTOR shall set stakes to mark the boundaries of construction easement across private property. The stakes shall be protected and maintained until completion of construction and cleanup.
- **B. Rights-of-Way -** Permits for Work in rights-of-way shall be obtained by the CONTRACTOR. All Work performed and all operations of CONTRACTOR, his employees, or subcontractors, within the limits of railroad and highway rights-of-way, shall be in conformity with the requirements and be under the control (through OWNER) of the railroad or highway authority owning, or having jurisdiction over and control of, the right-of-way in each case.

#### 1.25 Operation of Existing Facilities

Existing water and wastewater facilities shall be kept in continuous operation throughout the construction period. No interruption will be permitted which adversely affects the degree of service provided. Provided permission is obtained from OWNER in advance, portions of the existing facilities may be taken out of service for short periods corresponding with periods of minimum service demands.

CONTRACTOR shall provide temporary facilities and make temporary modifications as necessary to keep the existing facilities in operation during the construction period.

#### 1.26 Connections to Existing Facilities

Unless otherwise specified or indicated, CONTRACTOR shall make all necessary connections to existing facilities including structures, drain lines, and utilities. In each case, CONTRACTOR

#### **Division 1 - General Requirements**

# **SUMMARY OF WORK**

Section 01010

shall receive permission from OWNER or the owning utility prior to undertaking connections. CONTRACTOR shall protect facilities against deleterious substances and damage.

Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials and labor shall be on hand at the time of undertaking the connection. Work shall proceed continuously (around the clock) if necessary to complete connections in the minimum time. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

#### 1.27 Unfavorable Construction Conditions

No portion of the Work shall be constructed under conditions which adversely affect the quality or efficiency thereof, unless special means or precautions are taken by CONTRACTOR to perform the Work in a proper and satisfactory manner.

**END** 

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

Applicable portions of the Project Manual including but not limited to the Drawings and Specifications.

#### 1.2 SUMMARY

This Section includes administrative and procedural requirements governing allowances.

#### Definition:

Allowances. "'Allowance' is defined as "a not-to-be-exceeded amount", either individually or in the aggregate, which is established between the Owner and the CONTRACTOR as part of the bid documents when the precise scope of a particular line item(s) has not been defined to a level which is adequate for the CONTRACTOR to provide a definitive line item pricing for that particular scope of Work.

### 1.2.1 Allowance Scope of Work

This allowance is for the additional 16-inch water line work on Ferguson Lane, from Springdale Road to Sansom Road. The Work consists of trenching and placing approximately 800 linear feet of 16-inch PVC C900 DR14 water line.

#### 1.3 COORDINATION

At the earliest practical date after award of the Contract, the Contractor shall advise Owner of the date when final selection and purchase of each product or Work described by an Allowance must be completed to avoid delaying the Work.

Coordinate Allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

#### 1.4 PROCEDURES

Submit cost proposals for purchase of products or work included in Allowances in the form specified for Change Orders.

Coordinate and process submittals for Allowance items in accordance with Section 01300 as for other portions of the Work.

The use of any Allowances by the CONTRACTOR will be subject to the Owner's sole approval and it is the Owner's intent to minimize the use of Allowances to the fullest extent possible.

For any Allowances which the Owner allows the CONTRACTOR to use, the following rules shall apply:

(i) the Allowance shall cover the cost to the CONTRACTOR of the cost of Work, as defined in the Agreement and the CONTRACTOR's portion of overhead and profit associated with the stated Allowance; and

(ii) upon completion of the portion of the Work subject to an Allowance, the Contract Amount for that portion of the Work will be adjusted based upon the approved actual Cost of the Work, including the proportionate overhead and profit, provided however that the total amount of payments under the Allowances will not exceed the approved aggregate amount of the Allowances.

#### PART 2 - PRODUCTS

**NOT USED** 

#### **PART 3 - EXECUTION**

#### 3.1 SCHEDULE OF ALLOWANCES

Allowance No. 1 – Additional Water Line Scope \$250,000

This allowance is for the additional 16-inch water line work on Ferguson Lane, from Spring-dale Road to Sansom Road. The Work consists of trenching and placing approximately 800 linear feet of 16-inch PVC C900 DR14 water line.

#### 3.2 PAYMENT

Once the cost proposal for the Allowance has been incorporated into the Contract by Change Order, Payment for the Allowance will be based upon either the unit prices or a schedule of values provided with the proposal and incorporated in the Change Order.

**END** 

# Division 1 General Requirements Grades, Lines and Levels Section 01050

- 1. CONTRACTOR shall perform all layout work to transfer all controls for grades, lines, levels and measurements from a minimum of two reference points provided by OWNER. All survey work will be performed under the direct supervision of a Texas Registered Professional Land Surveyor (RPLS).
- 2. Within 5 work days of the Notice To Proceed date, or within 10 Working Days of initiating work based on the approved Schedule in a new area of the Project, the CONTRACTOR shall survey and stake the locations of all proposed improvements behind the curb and within the ROW (examples: manholes, storm inlets, fire hydrants, etc.), or any other improvements identified by the OWNER'S REPRESENTATIVE, for the purpose of identifying the nature and location of these improvements to the adjacent property owner(s). The OWNER'S REPRESENTATIVE will identify to the CONTRACTOR the improvements to be staked.
- 3. OWNER will not stake for construction and will not be on site for survey layout activities, except to perform quality control checks.
- 4. CONTRACTOR shall be required to set elevation hubs (blue tops) for subgrade and base course on centerline, at quarter points and curb lines or edge of pavement at intervals not exceeding 50 feet.
- 5. The construction plans will include horizontal and vertical control points. References to approved COA benchmarks used in establishing controls on the drawings will be provided by the Owner's E/A. In addition, on building projects and/or projects not built within an existing public ROW, a boundary survey will be supplied together with a legal description of the property and all easements where Work will take place.
- 6. CONTRACTOR shall submit construction staking layout sheets sealed by a Professional Engineer or Registered Professional Land Surveyor registered in the State of Texas. CONTRACTOR shall use a qualification based selection process consistent with the Professional Services Procurement Act, Chapter 2254.004 of the Texas Government Code, when securing the services of a Professional Engineer or Registered Professional Land Surveyor. It is a violation of State Law to solicit bids for the services of a Professional Engineer of Registered Professional Land Surveyor.
  - 6.1 Any discrepancies found with the construction documents' dimensional layout will be corrected. CONTRACTOR shall assure that the Owner's Representative and E/A are notified so that the appropriate actions are taken to correct the Contract drawings.
  - 6.2 All Work shall be done to the lines, grades and elevations indicated on the drawings. Information concerning basic horizontal and vertical control points will be provided by the E/A, **Engineering Services Division, Public Works Department**. These points shall be used as the datum basis under this Contract.
  - 6.3 All work to transfer all controls for grades, lines, levels, layout and measurements shall be performed under the supervision of a Texas Registered Professional Land Surveyor, provided by the CONTRACTOR. Such work shall conform to the standards for construction staking in the most recent edition of the Texas Society of Professional Surveyors Manual of Practice for Land Surveying, Category 5, Sections 1-12 inclusive.

- 6.4 The **centerline and** offset centerline stakes will be set at no greater than fifty (50) foot intervals **and at points of alignment or grade changes**. References to lines and grades as established by the CONTRACTOR's surveyor shall be in reference to these stake lines. The CONTRACTOR is required to provide a sealed statement from his RPLS that the controls are correct and the site layout has been done by their professional staff.
- 6.5 The CONTRACTOR shall place grade stakes and submit construction staking layout sheets. The CONTRACTOR shall allow a minimum of ten (10) days after submission to the Owner's Representative for review of construction staking layout sheets. Construction staking layout sheets shall include, at a minimum, the information contained in the form included at the end of this section. No Work shall be performed without Owner's Representative review and return to CONTRACTOR of construction staking layout sheets. The Owner's Representative, E/A and the CONTRACTOR shall review the survey controls on the ground.
- 6.6 Prior to any excavation, the CONTRACTOR shall establish the elevation to top of ground at **centerline of the pipe as well as cuts and** offset stakes at the distance deemed appropriate by the CONTRACTOR to preclude disturbance of offset stakes during construction.
- 6.7 The CONTRACTOR shall furnish, without charge, experienced personnel and such calibrated survey equipment, tools, stakes, and other materials that the Owner's Representative may require in establishing or checking control points, or in checking survey, layout, and measurement work performed by the CONTRACTOR.
- 6.8 The CONTRACTOR shall keep the Owner's Representative informed in a reasonable time in advance of the times and places at which he wishes to do work, so that any checking deemed necessary by the OWNER may be done with minimum inconvenience to the E/A and minimum delay to the CONTRACTOR. Surveying will be coordinated between the Owner's Representative and CONTRACTOR in a manner convenient to both.
- 6.9 During layout, CONTRACTOR shall field verify the elevation and alignment of all tie-in points to existing infrastructure. This work shall be performed sufficiently in advance of construction so that any conflicts may be resolved without delay. Any work done without being properly located may be ordered removed and replaced at the CONTRACTOR's expense.
- 6.10 The CONTRACTOR shall carefully preserve all monuments, benchmarks, reference points, and stakes. In case of the destruction thereof, the CONTRACTOR shall bear the cost of replacement and shall be responsible for any mistake or loss of time that may be caused. Permanent monuments or benchmarks, which must be removed or disturbed, shall be protected until properly referenced for relocation. The CONTRACTOR shall furnish materials and assistance for the proper replacement of such monuments or benchmarks.
- 6.11 The CONTRACTOR shall satisfy himself before commencing work as to the meaning and correctness of all survey control stakes, marks, etc., and no claim will be entertained by the OWNER for or on account of any alleged inaccuracies, unless the CONTRACTOR notifies the OWNER in writing before commencing the affected Work.
- 7. As needed for necessary documentation of the work progress, the CONTRACTOR shall maintain and/or protect offset or survey staking for the duration of the project. Any

re-staking required to meet this requirement shall be done at the CONTRACTOR'S expense.

- 8. This item is subsidiary to the work as a whole.
- 9. Upon completion of construction, or at intervals specified in the Contract, CONTRACTOR shall provide a record survey of the work in progress or completed. This information will be submitted to the Owner's Representative and shall be supplied electronically and on a separate full size plan sheet to be transmitted to the E/A for evaluation and merging into the Record Drawings.

End See attached "Construction Staking Layout Sheet"

#### **CONSTRUCTION STAKING LAYOUT SHEET**

Project Name:	Date:
C.I.P. ID#:	Instrument No.:
Person Recording:	Weather Conditions:
Crew Members:	
General Purpose & Scope of Survey:	

STATION	B.S.	H.I.	F.S.	LEVEL LOOP ELEVATION	ROD READING	HUB ELEVATION AT STATION	(TARGET) (eg., pipe invert) ELEVATION	C - CUT OR F - FILL	% GRADE	NOTES: INDICATE WHETHER CENTERLINE HUB OR FT. OFFSET HUB

#### **DEFINITIONS**

General: Basic Contract definitions are included in the General Conditions, Section 00700 included herein.

Approved: The term approved, when used in conjunction with the Owner's Representative's action on the CONTRACTOR'S submittals, applications, and requests, is limited to the Owner's Representative's duties and responsibilities as stated in the Conditions of the Contract. A stamp reading "No Exceptions Taken" shall have the same intent as "Approved".

Furnish: The term furnish means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

Installer: An Installer is the CONTRACTOR or another entity engaged by the CONTRACTOR, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in operations they are engaged to perform.

Project Site: The space available to the CONTRACTOR for performing construction activities either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

Provide: The term provide means to furnish and install, complete and ready for the intended use.

Regulations: The term regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

#### **INDUSTRY STANDARDS**

Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

Conflicting Requirements: Where compliance with two or more standards is specified and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer to the Owner's Representative for a decision before proceeding.

Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

Abbreviations and Names: Trade association names, titles of general standards, and names and titles of government agencies are frequently abbreviated. Where such acronyms or abbreviations are used in the

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Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

AA Aluminum Association

AABC Associated Air Balance Council

AAMA American Architectural Manufacturer's Association

AAN American Association of Nurserymen.

AASHTO American Association of State Highway and Transportation

Officials.

AATCC American Association of Textile Chemists and Colorists

ACI American Concrete Institute

ACIL American Council of Independent Laboratories

ACPA American Concrete Pipe Association

ADC Air Diffusion Council

AFBMA Anti-Friction Bearing Manufacturers Association

AGA American Gas Association

AGC Associated General Contractors of America

AGMA American Gear Manufacturers Association

AHA American Hardboard Association

AHAM Association of Home Appliance Manufacturers

Al Asphalt Institute

AIA American Institute of Architects

AIHA American Industrial Hygiene Association

AISC American Institute of Steel Construction

AISI American Iron and Steel Institute

AITC American Institute of Timber Construction.

ALCA Associated Landscape Contractors of America

ALI Associated Laboratories, Inc.

ALSC American Lumber Standards Committee

AMCA Air Movement and Control Association

ANSI American National Standards Institute.

AOAC Association of Official Analytical Chemists

AOSA Association of Official Seed Analysts

APA American Plywood Association

API American Petroleum Institute.

AREA American Railroad Engineers Association

ARI Air Conditioning and Refrigeration Institute

ARMA Asphalt Roofing Manufacturers Association

ASA Acoustical Society of America

ASA American Standards Association.

ASC Adhesive and Sealant Council

ASCE American Society of Civil Engineers

ASHRAE American Society of Heating, Refrigerating & Air

**Conditioning Engineers** 

ASME American Society of Mechanical Engineers

ASPE American Society of Plumbing Engineers

ASSE American Society of Sanitary Engineering

ASTM American Society for Testing and Materials.

AWCMA American Window Covering Manufacturers Association

AWG American Wire Gage

AWI Architectural Woodwork Institute

AWPA American Wood Preservers Association

AWPB American Wood Preservers Bureau

AWPI American Wood Preservers Institute

AWS American Welding Society

AWWA American Water Works Association

BHMA Builders Hardware Manufacturers Association

BIA Brick Institute of America

BIFMA Business and Institutional Furniture Manufacturers Association

CAGI Compressed Air and Gas Institute

CAUS Color Association of the United States

CBM Certified Ballast Manufacturers

CCC Carpet Cushion Council

CDA Copper Development Association

CE Corps of Engineers

CFR Code of Federal Regulations

CGA Compressed Gas Association

CISCA Ceiling and Interior Systems Construction Association

CISPI Cast Iron Soil Pipe Institute

**CPSC** Consumer Product Safety Commission

CRI Carpet and Rug Institute

CRSI Concrete Reinforcing Steel Institute

CS Commercial Standard of NBS (U.S. Dept. of Commerce)

CTI Ceramic Tile Institute

DFPA **Douglas Fir Plywood Association** 

DHI Door and Hardware Institute

DLPA **Decorative Laminate Products Association** 

DOC U.S. Department of Commerce

DOT Department of Transportation

**ECSA Exchange Carriers Standards Association** 

ΕIΑ **Electronic Industries Association** 

**EIMA** Exterior Insulation Manufacturers Association

**EJMA Expansion Joint Manufacturers Association** 

EPA **Environmental Protection Agency** 

FAA Federal Aviation Administration

FCC Federal Communications Commission

**FGMA** Flat Glass Marketing Association

FHA Federal Housing Administration

FΜ Factory Mutual Research Organization

FS Federal Specifications

FSC Forest Stewardship Council

Facing Tile Institute FTI

GΑ Gypsum Association

**GSA** General Services Administration HEI Heat Exchange Institute

HI Hydronics Institute

H.I. Hydraulic Institute

HMA Hardwood Manufacturers Association

HPMA Hardwood Plywood Manufacturers Association

IBD Institute of Business Designers

ICEA Insulated Cable Engineers Association, Inc.

IEEE Institute of Electrical and Electronic Engineers, Inc.

IESNA Illuminating Engineering Society of North American

IGCC Insulating Glass Certification Council

ILI Indiana Limestone Institute of America

IMSA International Municipal Signal Association

IRI Industrial Risk Insurers

ISA Instrument Society of America

ITE Institute of Transportation Engineers

LEED<sup>TM</sup> Leadership in Energy and Environmental Design

LIA Lead Industries Association, Inc.

LPI Lightning Protection Institute

MBMA Metal Building Manufacturer's Association

MCAA Mechanical Contractors Association of America

MFMA Maple Flooring Manufacturers' Association

MIA Marble Institute of America

ML/SFA Metal Lath/Steel Framing Association

MSS Manufacturers Standardization Society of the Valve and

Fittings Industry

MUTCD Texas Department of Transportation Manual on Uniform Traffic Control Devices

NAAMM National Association of Architectural Metal

Manufacturers

NAIMA North American Insulation Manufacturers Association

NAPA National Asphalt Pavement Association

NBFU National Board of Fire Underwriters

NBGQA National Building Granite Quarries Association

NBS National Bureau of Standards (U.S. Dept. of Commerce)

NCMA National Concrete Masonry Association

NCRPM National Council on Radiation Protection and Measurements

NCSPA National Corrugated Steel Pipe Association

NEC National Electrical Code (Published by NFPA)

NECA National Electrical Contractors Association

NEII National Elevator Industry, Inc.

NEMA National Electrical Manufacturers Association

NETA International Electrical Testing Association

N.F.P.A. National Forest Products Association

NFPA National Fire Protection Association

NHLA National Hardwood Lumber Association

NIST National Institute of Standards and Technology

NLGA National Lumber Grades Authority

NOFMA National Oak Flooring Manufacturers Association

NPA National Particleboard Association

NPCA National Paint and Coatings Association

NRCA National Roofing Contractors Association

NWMA National Woodwork Manufacturers Association

OSHA Occupational Safety and Health Administration

PCA Portland Cement Association

PCI Precast/Prestressed Concrete Institute

PDI Plumbing and Drainage Institute

PE Professional Engineer

REA Rural Electrification Administration

RFCI Resilient Floor Covering Institute

RMA Rubber Manufacturing Association

RPLS Registered Professional Land Surveyor

SDI Steel Deck Institute

S.D.I. Steel Door Institute

SFPA Southern Forest Products Association

SGCC Safety Glazing Certification Council

SIGMA Sealed Insulating Glass Manufacturers Association

SJI Steel Joist Institute

SMACNA Sheet Metal and Air Conditioning Contractors National Association

SPIB Southern Pine Inspection Bureau

SPRI Single Ply Roofing Institute

SSPC Steel Structures Painting Council

SSPMA Sump and Sewage Pump Manufacturers Association

SWI Steel Window Institute

SWPA Submersible Wastewater Pump Association

TCA Tile Council of America

TEX TEST TxDOT Laboratory Test

TIMA Thermal Insulation Manufacturers Association

TPI Truss Plate Institute

TxDOT Texas Department of Transportation

UL Underwriters Laboratory, Inc.

USDA U. S. Department of Agriculture

USGBC U. S. Green Building Council

USPS U. S. Postal Service

WCLIB West Coast Lumber Inspection Bureau

WCMA Wallcovering Manufacturers Association

WIC Woodwork Institute of California

WLPDIA Western Lath, Plaster, Drywall Industries Association

WRI Wire Reinforcement Institute

WSC Water Systems Council

WSFI Wood and Synthetic Flooring Institute

WWPA Western Wood Products Association

W.W.P.A. Woven Wire Products Association

**END** 

# Division 1 General Requirements STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Section 01096

The Storm Water Pollution Prevention Plan for this project is attached.

Issue Date 05/06/11 SWPPP / 01096 Page 1 of 1

# Stormwater Pollution Prevention Plan (SWPPP)

#### For Construction Activities At:

AWU Springdale / 290 Water Line Improvements COA Grid: N 27 & N 28 & P 27 Austin, Texas 78754 512-972-1168

#### **SWPPP Prepared For:**

City of Austin, Austin Water Utility Joe Hoepken, Austin Water Utility 625 East 10<sup>th</sup> Street Austin, Texas 78701 512-972-1168 Joe.Hoepken@austintexas.gov

# **SWPPP Prepared By:**

City of Austin Public Works Department
Kimberly Gilbertson, Landscape Architect Associate
505 Barton Springs Road, 9<sup>th</sup> Floor
Austin, Texas 78704
512-974-7006
Kimberly.gilbertson@austintexas.gov

#### **SWPPP Preparation Date:**

01/26/2018

**Estimated Project Dates:** 

Project Start Date: Insert Date

**Project Completion Date: Insert Date** 

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### SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

# 1.1 Operator(s) / Subcontractor(s)

# Instructions (see definition of "operator" at CGP Part 1.1.1):

- Identify the operator(s) who will be engaged in construction activities at the site.
   Indicate respective responsibilities, where appropriate. Also include the 24-hour emergency contact.
- List subcontractors expected to work on-site. Notify subcontractors of stormwater requirements applicable to their work.
- Consider using Subcontractor Agreements such as the type included as a sample in Appendix G of the Template.

#### Operator(s):

City of Austin, Austin Water Utility Joe Hoepken 625 East 10<sup>th</sup> Street Austin, Texas 78701 512-972-1168 Joe.hoepken@austintexas.gov

# Subcontractor(s):

Insert Company or Organization Name
Insert Name
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email
Insert area of control (if more than one operator at site)

# **Emergency 24-Hour Contact:**

City of Austin Public Works Department, Project Management Division Brenda Baker 512-974-1175 Brenda.baker@austintexas.gov

#### 1.2 Stormwater Team

# Instructions (see CGP Part 7.2.2):

- Identify the individuals (by name or position) that are part of the project's stormwater team, their individual responsibilities, and which members are responsible for inspections. At a minimum the stormwater team is comprised of individuals who are responsible for overseeing the development of the SWPPP, any later modifications to it, and for compliance with the permit requirements (i.e., installing and maintaining stormwater controls, conducting site inspections, and taking corrective actions where required).
- Each member of the stormwater team must have ready access to either an electronic or paper copy of applicable portions of the 2017 CGP and the SWPPP.

Stormwater Team						
Name and/or position, and contact	Responsibilities	I Have Read the CGP and Understand the Applicable Requirements				
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.				
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.				
Insert name of responsible person Insert Position Insert Telephone Number Insert Email	Insert Responsibility	☐ Yes Date: Click here to enter a date.				

[Insert or delete rows as necessary.]

# SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

#### 2.1 **Project/Site Information**

#### Instructions (see "Project/Site Information" section of Appendix J – NOI form):

In this section, you are asked to compile basic site information that will be helpful when you file your NOI.

Project/Site Name: AWU Springdale / 290 Water Line Improvements Project Street/Location: COA Grid N 27 & N 28 & P 27 City: Austin State: Texas ZIP Code: 78754 County or Similar Subdivision: Travis Business days and hours for the project: TBD Project Latitude/Longitude Latitude: 30.301615° N Longitude: - 97.715226 ° W (decimal degrees) (decimal degrees) Latitude/longitude data source: GPS Other (please specify): Map Horizontal Reference Datum:  $\boxtimes$  NAD 83  $\square$  WGS 84  $\square$  NAD 27 **Additional Project Information** Are you requesting permit coverage as a "federal operator" as defined ☐ Yes  $\square$  No in Appendix A of the 2017 CGP? Is the project/site located on Indian country lands, or located on a ☐ Yes No. property of religious or cultural significance to an Indian tribe?

If yes, provide the name of the Indian tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property: N/A

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency (e.g., natural disaster, extreme flooding conditions), information substantiating its occurrence (e.g., state disaster declaration), and a description of the construction necessary to reestablish effective public services: Insert Text Here

# 2.2 Discharge Information

# Instructions (see "Discharge Information" section of Appendix J – NOI form):

- In this section, include information relating to your site's discharge. This information corresponds to the "Discharge Information" section of the NOI form.
- List all of the stormwater points of discharge from your site. Identify each point of discharge with a unique 3-digit ID (e.g., 001, 002).
- For each unique point of discharge you list, specify the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to. You may have multiple points of discharge that discharge to the same receiving water.
- Next, specify whether any waters of the U.S. that you discharge to are listed as
   "impaired" as defined in <u>Appendix A</u>, and the pollutants causing the impairment.
   Identify any Total Maximum Daily Loads (TMDL) that have been completed for any of
   the waters of the U.S. that you discharge to and the pollutants for which there is a TMDL.
   For more information on impaired waters and TMDLs, including a list of TMDL contacts
   and links by state, visit <a href="https://www.epa.gov/tmdl">https://www.epa.gov/tmdl</a>.
- Finally, indicate whether any water of the U.S. that you discharge to is designated as a
  Tier 2, Tier 2.5, or Tier 3 water and if so, what the designation is (2, 2.5, or 3). A list of Tier 2,
  2.5, and 3 waters is provided in <a href="Appendix F">Appendix F</a>.

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?	⊠ Yes	□No
Are there any waters of the U.S. within 50 feet of your project's earth disturbances?	⊠ Yes	□No

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:									
Point of Discharge ID	Name of receiving water:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?	
[001]	Ferguson Branch Creek	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A	N/A	☐ Yes ☒ No	N/A	
[002]	Walnut Creek	☐ Yes ⊠ No	N/A	☐ Yes ⊠ No	N/A	N/A	☐ Yes ⊠ No	N/A	
[003]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No		
[004]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No		
[005]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No		
[006]		☐ Yes ☐ No		☐ Yes ☐ No			☐ Yes ☐ No		

[Include additional rows or delete as necessary.]

#### 2.3 Nature of the Construction Activities

#### Instructions (see CGP Parts 1.2.1.c and 7.2.3):

- Provide a general description of the nature of the construction activities at your site.
- Describe the size of the property (in acres or in miles if a linear construction site), the
  total area expected to be disturbed by the construction activities (to the nearest
  quarter acre or quarter mile if a linear construction site), and the maximum area
  expected to be disturbed at any one time.
- Indicate the type of construction site, whether there will be certain demolition activities, and whether the predevelopment land use was for agriculture.
- Provide a list and description of all pollutant-generating activities (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations) and indicate for each activity the type of pollutant that will be generated (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels) and could be discharged in stormwater from your site.
- Describe the construction support activities covered by this permit (see Part 1.2.1.c of the permit).

#### **General Description of Project**

Provide a general description of the nature of your construction activities, including the age dates of past renovations for structures that are undergoing demolition:

The project consists of water system improvements at the Springdale Road and US Highway 290 access road intersection and other improvements to create a Reduced North Pressure Zone by installing pressure reducing valve stations and associated waterline improvements identified by the Austin Water (AW).

The set of construction plans includes the water system improvements at the Springdale Road and US Highway 290 access road intersection. The proposed water system improvements are located within the limits of construction of the proposed US Highway 290 improvements recently completed by the Central Texas Regional Mobility Authority. The plans also include the improvements to expand on the new pressure zone created with the intersection plans and replace approximately 15,973 linear feet of water mains ranging from 8-inch to 16-inch in diameter along US 290 and in the Chimney Hill and the Walnut Trace Subdivisions. The streets with proposed improvements are: US 290 from Chimney Hill Blvd to Springdale Road, Springdale Road from US 290 to Breeds Hill, Carla Dr. on the east side of Springdale Road, Quiette Dr. on the west side of Springdale Road, E-K Lane on the east and west side of Springdale Road, Ferguson Lane from the east cul-de-sac to Sansom Road, and Sansom Road from Ferguson Lane to almost Bosque Lane. Quiette Drive (on the east side of Springdale Road) is also included in the plan set for water improvements.

As a portion of the project outlined above, approximately 3,900 liner feet of horizontal directional drilling will be incorporated to limit the impacts to the creek crossings at the Ferguson branch of Walnut Creek and Walnut Creek. This methodology of trenchless installation is a portion of the total amount outlined and not in addition to. The remaining portion will be installed via open trench.

#### Size of Construction Site

Size of Property	18.88 Acres
Total Area Expected to be Disturbed by Construction Activities	1.40 Acres
Maximum Area Expected to be Disturbed at Any One Time	0.0114 Acres

[Repeat as necessary for individual project phases.]

Type of Construction Site (check all that apply):			
$\square$ Single-Family Residential $\square$ Multi-Family Residential $\square$ (	Commercia	I 🗆 Ind	dustrial
$\square$ Institutional $\square$ Highway or Road $\boxtimes$ Utility $\square$ Other $\_$			
Will there be demolition of any structure built or renovated before January 1, 1980?	☐ Yes	⊠ No	
If yes, do any of the structures being demolished have at least 10,000 square feet of floor space?	☐ Yes	□No	⊠ N/A
Was the pre-development land use used for agriculture (see <a href="Appendix A">A for definition of "agricultural land")?</a>	☐ Yes	⊠ No	

# **Pollutant-Generating Activities**

List and describe all pollutant-generating activities and indicate for each activity the type of pollutant that will be generated. Take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed during construction.

Pollutant-Generating Activity	Pollutants or Pollutant Constituents
(e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations)	(e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels)
Fuel storage and use, and other vehicular contaminants (i.e. oil, lubricants, etc.)	Vehicular fuel use and oil
Construction vehicles tracking onto public roads	Sediment and dust
Solid waste	Construction and domestic waste

[Include additional rows or delete as necessary.]

#### **Construction Support Activities** (only provide if applicable)

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas):

Support activities will include equipment and material staging that will move as construction progresses.

Contact information for construction support activity:

**INSERT NAME** 

INSERT TELEPHONE NO.

**INSERT EMAIL** 

INSERT ADDRESS AND/OR LATITUDE/LONGITUDE

[Repeat as necessary.]

## 2.4 Sequence and Estimated Dates of Construction Activities

# Instructions (see CGP Part 7.2.5):

- Describe the intended construction sequence and duration of major activities.
- For each portion or phase of the construction site, include the following:
  - Commencement and duration of construction activities, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - ✓ Temporary or permanent cessation of construction activities;
  - ✓ Temporary or final stabilization of areas of exposed soil. The dates for stabilization must reflect the applicable deadlines to which you are subject to in Part 2.2.14; and
  - ✓ Removal of temporary stormwater controls and construction equipment or vehicles, and cessation of any pollutant-generating activities.
- The construction sequence must reflect the following requirements:
  - ✓ Part 2.1.3 (installation of stormwater controls); and
  - ✓ Parts 2.2.14 (stabilization deadlines).

## Phase I

- 1. See remedial tree care note (ECM p-6)
- 2. Hold pre-construction conference
- 3. Temporary erosion/sedimentation controls and tree protection are to be installed as indicated on the approved plan and in accordance with the stormwater pollution prevention plan (SWPPP) that is required to be posted on the site. Install tree protection
- 4. The environmental project manager or site supervisor must contact the Watershed Protection Department, Environmental Inspection at 512-974-2278 72 hours prior to the scheduled date of the required on-site preconstruction meeting.
- 5. Temporary erosion/sedimentation controls will be inspected and revised, if needed, to comply with City inspectors' directives.
- 6. Temporary erosion and sedimentation controls will be inspected and maintained in accordance with the SWPPP posted on the site.
- 7. Set-up traffic control plans as indicated on the approved plan.
- 8. Begin construction activities.
- 9. Complete construction and start revegetation of the site.
- 10. After a final inspection has been conducted by the City inspector and with approval from the City inspector, remove the temporary erosion/sedimentation controls and tree protection. Restore any areas disturbed during removal of erosion/sedimentation controls and/or tree protection.

Estimated Start Date of Construction Activities for this Phase	INSERT ESTIMATED DATE
Estimated End Date of Construction Activities for this Phase	INSERT ESTIMATED DATE
Estimated Date(s) of Application of Stabilization Measures	INSERT ESTIMATED DATE
for Areas of the Site Required to be Stabilized	[Add additional dates as necessary]
Estimated Date(s) when Stormwater Controls will be	INSERT ESTIMATED DATE
Removed	[Add additional dates as necessary]

#### Phase II

INSERT GENERAL DESCRIPTION OF PHASE	
Estimated Start Date of Construction Activities for this Phase	INSERT ESTIMATED DATE
Estimated End Date of Construction Activities for this Phase	INSERT ESTIMATED DATE
Estimated Date(s) of Application of Stabilization Measures	INSERT ESTIMATED DATE
for Areas of the Site Required to be Stabilized	[Add additional dates as necessary]
Estimated Date(s) when Stormwater Controls will be	INSERT ESTIMATED DATE
Removed	[Add additional dates as necessary]

[Repeat as needed.]

## 2.5 Authorized Non-Stormwater Discharges

### Instructions (see CGP Parts 1.2.2 and 7.2.5):

- Identify all authorized sources of non-stormwater discharges. The authorized non-stormwater discharges identified in Part 1.2.2 of the 2017 CGP include:
  - ✓ Discharges from emergency fire-fighting activities;
  - ✓ Fire hydrant flushings;
  - ✓ Landscape irrigation;
  - ✓ Waters used to wash vehicles and equipment, provided that there is no discharge
    of soaps, solvents, or detergents used for such purposes;
  - ✓ Water used to control dust;
  - ✓ Potable water including uncontaminated water line flushings;
  - ✓ External building washdown, provided soaps, solvents and detergents are not used, and external surfaces do not contain hazardous substances (e.g., paint or caulk containing PCBs);
  - ✓ Pavement wash waters provided spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control:
  - ✓ Uncontaminated air conditioning or compressor condensate;
  - ✓ Uncontaminated, non-turbid discharges of ground water or spring water;
  - ✓ Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
  - ✓ Construction dewatering water discharged in accordance with Part 2.4.

# List of Authorized Non-Stormwater Discharges Present at the Site

Type of Authorized Non-Stormwater Discharge	Likely to be Present at Your Site?
Discharges from emergency fire-fighting activities	☐ Yes ⊠ No
Fire hydrant flushings	
Landscape irrigation	☐ Yes ⊠ No
Waters used to wash vehicles and equipment	
Water used to control dust	
Potable water including uncontaminated water line flushings	☐ Yes ⊠ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☐ Yes ☒ No
Pavement wash waters	☐ Yes ⊠ No
Uncontaminated air conditioning or compressor condensate	☐ Yes ⊠ No
Uncontaminated, non-turbid discharges of ground water or spring water	☐ Yes ⊠ No
Foundation or footing drains	☐ Yes ⊠ No
Construction dewatering water	☐ Yes ⊠ No

(Note: You are required to identify the likely locations of these authorized non-stormwater discharges on your site map. See Section 2.6, below, of the SWPPP Templaste.)

## 2.6 Site Maps

## Instructions (see CGP Part 7.2.4):

Attach site maps in Appendix A of the Template. For most projects, a series of site maps is necessary and recommended. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or, for more complicated sites, show the major phases of development.

## These maps must include the following features:

- Boundaries of the property and of the locations where construction will occur, including:
  - ✓ Locations where earth-disturbing activities will occur, noting any phasing of construction activities and any demolition activities;
  - ✓ Approximate slopes before and after major grading activities. Note areas of steep slopes, as defined in CGP Appendix A;
  - ✓ Locations where sediment, soil, or other construction materials will be stockpiled;
  - ✓ Locations of any crossings of waters of the U.S.;
  - ✓ Designated points where vehicles will exit onto paved roads;
  - ✓ Locations of structures and other impervious surfaces upon completion of construction; and
  - ✓ Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1.c).
- Locations of all waters of the U.S., including wetlands, on your site and within one mile downstream of the site's discharge point. Indicate which waterbodies are listed as impaired, and which are identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 waters.
- Areas of federally-listed critical habitat for endangered or threatened species within the site and/or at discharge locations.
- Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures)
- Drainage pattern(s) of stormwater and authorized non-stormwater before and after major grading activities.
- Stormwater and authorized non-stormwater discharge locations, including:
  - ✓ Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets; and
  - ✓ Locations where stormwater or allowable non-stormwater will be discharged to waters of the U.S. (including wetlands).
- Locations of all potential pollutant-generating activities.
- Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with the permit.
- Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

See attached site map in Appendix A

### SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

# 3.1 Endangered Species Protection

Instructions (see CGP Parts 1.1.5, 7.2.9.a, Appendix D, and the "Endangered Species Protection" section of the Appendix J – NOI form):

Using the instructions in <u>Appendix D</u> of the permit, determine under which criterion listed below (A-F) you are eligible for coverage under this permit with respect to the protection of endangered species. To make this determination, you must use information from **BOTH** the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Both the NMFS and USFWS maintain lists of Endangered Species Act-listed (ESA-listed) species and designated critical habitat. Operators must consult both when determining their eligibility.

- Check only 1 box, include the required information and provide a sound basis for supporting the criterion selected. Select the most conservative criterion that applies
- Include documentation supporting your determination of eligibility.
- A step-by-step guide and flow-chart on ESA provisions for EPA's CGP is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#species

### **Eligibility Criterion**

Under which criterion listed in Appendix D are you eligible for coverage under this permit?

Inder which criterion listed in <u>Appendix D</u> are you eligible for coverage under this permit?
Criterion A: No ESA-listed species and/or designated critical habitat present in action area.  Using the process outlined in Appendix D of this permit, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.
<b>Basis statement content/Supporting documentation:</b> A basis statement supporting the selection of Criterion A should identify the USFWS and NMFS information sources used. Attaching aerial image(s) of the site to your NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers. Check the applicable source(s) of information you relied upon:
Specific communication with staff of the USFWS and/or NMFS. INSERT DATE OF COMMUNICATION AND WHO YOU SPOKE WITH
Species list from USFWS and/or NMFS. See the <u>CGP ESA webpage</u> , <u>Step 2</u> for available websites. https://ecos.fws.gov/ipac/location/index
Criterion B: Eligibility requirements met by another operator under the 2017 CGP. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2017 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2017CGP operator's notification of authorization under this permit. If your certification is based on

another 2017 CGP operator's certification under criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in criterion C in your NOI form.

**Basis statement content/Supporting documentation**: A basis statement supporting the selection of Criterion B should identify the eligibility criterion of the other CGP NOI, the authorization date, and confirmation that the authorization is effective.

- ✓ Provide the 9-digit NPDES ID number from the other operator's NOI under the 2017 CGP: \_\_\_\_\_\_\_
   ✓ Authorization date of the other 2017 CGP operator: INSERT AUTHORIZATION DATE
- ✓ Eligibility criterion of the other 2017 CGP operator: □A □C □D □E □F

OF OTHER OPERATOR

✓ Provide a brief summary of the basis the other operator used for selecting criterion
A, C, D, E, or F: INSERT TEXT HERE

Ш	Criterion C: Discharges not likely to adversely affect ESA-listed species and/or designated
	<u>critical habitat</u> . ESA-listed species and/or designated critical habitat(s) under the
	jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area,"
	and you certify to EPA that your site's discharges and discharge-related activities are not
	likely to adversely affect ESA-listed threatened or endangered species and/or designated
	critical habitat. This certification may include consideration of any stormwater controls
	and/or management practices you will adopt to ensure that your discharges and
	discharge-related activities are not likely to adversely affect ESA-listed species and/or
	designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-
	listed species and/or designated habitat located in your "action area" using the process
	outlined in Appendix D of this permit; 2) the distance between the site and the listed
	species and/or designated critical habitat in the action area (in miles); and 3) a rationale
	describing specifically how adverse effects to ESA-listed species will be avoided from the
	discharges and discharge-related activities. You must also include a copy of your site map
	from your SWPPP showing the upland and in-water extent of your "action area" with this
	NOI

**Basis statement content/Supporting documentation**: A basis statement supporting the selection of Criterion C should identify the information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

- ✓ Resources used to make determination: INSERT RESOURCES YOU USED TO
  DETERMINE THAT DISCHARGES ARE NOT LIKELY TO ADVERSELY AFFECT ESA-LISTED
  SPECIES OR DESIGNATED CRITICAL HABITAT
- ✓ ESA-listed Species/Critical Habitat in action area: INSERT LIST OF ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT LOCATED IN YOUR ACTION AREA
- ✓ Distance between site and ESA-listed Species/Critical Habitat: INSERT DISTANCE BETWEEN YOUR SITE AND THE ESA-LISTED SPECIES OR CRITICAL HABITAT (in miles)
- ✓ How adverse effects will be avoided: DESCRIBE SPECIFICALLY HOW ADVERSE EFFECTS TO ESA-LISTED SPECIES WILL BE AVOIDED FROM THE DISCHARGES AND DISCHARGE-RELATED ACTIVITIES

Criterion D: Coordination with USFWS and/or NMFS has successfully conclude	<u>∍d.</u>
Coordination between you and the USFWS and/or NMFS has concluded. Th	e coordination

must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written concurrence from USFWS and/or NMFS that your site's discharges and discharge-related activities are not likely to adversely affect listed species and/or critical habitat. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion D should identify whether USFWS or NMFS or both agencies participated in coordination, the field office/regional office(s) providing that coordination, and the date that coordination concluded.

- ✓ Agency coordinated with: □USFWS □ NMFS
- ✓ Field/regional office(s) providing coordination: INSERT FIELD/REGIONAL OFFICE(S)
  PROVIDING COORDINATION
- ✓ Date coordination concluded: INSERT DATE COORDINATION CONCLUDED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding coordination activities.

Federo The co discho the jur	on E: ESA Section 7 consultation has successfully concluded. Consultation between a call Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. Insultation must have addressed the effects of the construction site's discharges and arge-related activities on ESA-listed species and/or designated critical habitat under isdiction of USFWS and/or NMFS. To certify eligibility under this criterion, Indicate the of the consultation:
	Biological opinion from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or
	Written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion E should identify the federal action agency (ies) involved, the field office/regional office(s) providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the consultation was completed.

- √ Federal agency(ies) involved: INSERT FEDERAL AGENCY(IES) INVOLVED
- ✓ Field/regional office(s) providing consultation: INSERT FIELD/REGIONAL OFFICE(S)
  PROVIDING CONSULTATION
- Tracking numbers associated with consultation: INSERT CONSULTATION TRACKING NUMBER(S)
- ✓ Date consultation completed: INSERT DATE CONSULTATION COMPLETED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation.

this NOI.

Criterion F: Issuance of section 10 permit. Potential take is authorized through the issuance
of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization
addresses the effects of the site's discharges and discharge-related activities on ESA-listed
species and designated critical habitat. You must include copies of the correspondence
between yourself and the participating agencies in your SWPPP and your NOI.

**Basis statement content/Supporting documentation:** A basis statement supporting the selection of Criterion F should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional office(s) providing permit(s), any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, PCTS number), and the date the permit was granted.

- ✓ Agency providing section 10 permit: □USFWS □NMFS
- ✓ Field/regional office(s) providing permit: INSERT FIELD/REGIONAL OFFICE(S)
  PROVIDING PERMIT
- ✓ Tracking numbers associated with consultation: INSERT CONSULTATION TRACKING NUMBER(S)
- ✓ Date permit granted: INSERT DATE PERMIT GRANTED
- ✓ Attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service.

#### 3.2 Historic Preservation

Instructions (see CGP Part 1.1.6, 7.2.9.b, Appendix E, and the "Historic Preservation" section of the Appendix J – NOI form):

Follow the screening process in Appendix E of the permit for determining whether your installation of subsurface earth-disturbing stormwater controls will have an effect on historic properties.

- Include documentation supporting your determination of eligibility.
- To contact your applicable state or tribal historic preservation office, information is available at <a href="https://www.achp.gov/programs/html">www.achp.gov/programs/html</a>.

# Appendix E, Step 1

Do you plan on installing	any of the following	g stormwater	controls at y	your site?	Check all th	at apply
below, and proceed to A	Appendix E, Step 2.					

low, c	and proceed to Appendix E, Step 2.
	Dike
□в	erm
	Catch Basin
□Р	ond
□ S <sup>-</sup>	tormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)
	Culvert
	Other type of ground-disturbing stormwater control: stabilized construction entrances, silt fence tree protection, and wood planking.

(Note: If you will not be installing any ground-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.)

## Appendix E, Step 2

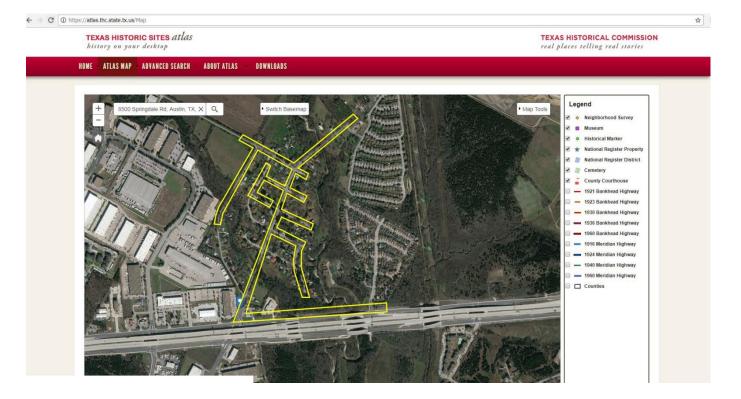
If you answered yes in Step 1, have prior surveys or evaluations conducted on the site already determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties?  $\square$  YES  $\square$  NO

- If yes, no further documentation is required for Section 3.2 of the Template.
- If no, proceed to Appendix E, Step 3.

## Appendix E, Step 3

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties?  $\boxtimes$  YES  $\square$  NO

If yes, provide documentation of the basis for your determination. Texas Historical Commission (https://atlas.thc.state.tx.us/Map). See map below:



If no, proceed to Appendix E, Step 4.

### Appendix E, Step 4 N/A

If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties?  $\square$  YES  $\square$  NO

If no, no further documentation is required for Section 3.2 of the Template.
If yes, describe the nature of their response:  Written indication that no historic properties will be affected by the installation of stormwater controls. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
□ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
Other: INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE
3.3 Safe Drinking Water Act Underground Injection Control Requirements
Instructions (see CGP Part 7.2.9.c):
<ul> <li>If you will use any of the identified controls in this section, include documentation of contact between you and the applicable state agency or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR Parts 144-147. \</li> <li>For state UIC program contacts, refer to the following EPA website: <a href="https://www.epa.gov/uic">https://www.epa.gov/uic</a>.</li> </ul>
Do you plan to install any of the following controls? Check all that apply below. N/A
☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system) N/A
<ul> <li>Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow N/A</li> </ul>
<ul> <li>Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system) N/A</li> </ul>

IF YES, INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE STATE AGENCY OR EPA REGIONAL OFFICE

### **SECTION 4: EROSION AND SEDIMENT CONTROLS**

## General Instructions (See CGP Parts 2.2 and 7.2.6):

- Describe the erosion and sediment controls that will be installed and maintained at your site.
- Describe any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon).
- Describe any routine stormwater control maintenance specifications.
- Describe the projected schedule for stormwater control installation/implementation.

## 4.1 Natural Buffers or Equivalent Sediment Controls

## Instructions (see CGP Parts 2.2.1 and 7.2.6.b.i, and Appendix G):

This section only applies to you if a water of the U.S. is located within 50 feet of your site's earth disturbances. If this is the case, consult CGP Part 2.2.1 and Appendix G for information on how to comply with the buffer requirements.

- Describe the compliance alternative (CGP Part 2.2.1.a.i, ii, or iii) that was chosen to
  meet the buffer requirements, and include any required documentation supporting the
  alternative selected. The compliance alternative selected must be maintained
  throughout the duration of permit coverage. However, if you select a different
  compliance alternative during your period of permit coverage, you must modify your
  SWPPP to reflect this change.
- If you qualify for one of the exceptions in CGP Part 2.2.1.b, include documentation related to your qualification for such exceptions.

Buffer Compliance Alternatives
Are there any waters of the U.S. within 50 feet of your project's earth disturbances?   YES  NO  (Note: If no, no further documentation is required for Part 4.1 in the SWPPP Template. Continue on to Part 4.2.)
Check the compliance alternative that you have chosen:
<ul> <li>□ (i) I will provide and maintain a 50-foot undisturbed natural buffer.</li> <li>(Note (1): You must show the 50-foot boundary line of the natural buffer on your site map.)</li> <li>(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)</li> </ul>
☐ (ii) I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.  (Note (1): You must show the boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)

- INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED
- INSERT EITHER ONE OF THE FOLLOWING:
  - (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

OR

- (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD
    REDUCTIONS FROM THE COMBINATION OF THE BUFFER AREA AND ADDITIONAL EROSION
    AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE COMBINATION OF YOUR BUFFER AREA AND THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER
- (iii) It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.
  - INSERT RATIONALE FOR CONCLUDING THAT IT IS INFEASIBLE TO PROVIDE AND MAINTAIN A NATURAL BUFFER OF ANY SIZE
  - INSERT EITHER ONE OF THE FOLLOWING:
    - (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

OR

- (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD REDUCTIONS FROM THE EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER

$\boxtimes$ I qualify for one of the exceptions in Part 2.2.1.b. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)
Buffer Exceptions Which of the following exceptions to the buffer requirements applies to your site?  ☐ There is no discharge of stormwater to the water of the U.S. that is located 50 feet from my
construction disturbances.  (Note: If this exception applies, no further documentation is required for Section 4.1 of the Template.)
<ul> <li>No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.</li> <li>(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the</li> </ul>
Template.)  (Note (2): Where some natural buffer exists but portions of the area within 50 feet of the surface water are occupied by preexisting development disturbances, you must still comply with the one of the CGP Part 2.2.1.a compliance alternatives.)
For a "linear construction sites" (defined in Appendix A), site constraints (e.g., limited right-of-way) make it infeasible to meet any of the CGP Part 2.2.1.a compliance alternatives. Construction will be within pavement area only and will not be disturbing the creek.
<ul> <li>☐ The project qualifies as "small residential lot" construction (defined in Appendix A) (see Appendix G, Part G.3.2).</li> <li>☐ For Alternative 1:</li> </ul>
<ul> <li>INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED</li> <li>INSERT APPLICABLE REQUIREMENTS BASED ON TABLE G-1</li> <li>INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS</li> </ul>
<ul> <li>For Alternative 2:</li> <li>INSERT (1) THE ASSIGNED RISK LEVEL BASED ON APP. G APPLICABLE TABLE G-2 THROUGH G-6 AND (2) THE PREDOMINANT SOIL TYPE AND AVERAGE SLOPE AT YOUR SITE</li> <li>INSERT APPLICABLE REQUIREMENTS BASED ON APP. G, TABLE G-7</li> <li>INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS</li> </ul>
☐ Buffer disturbances are authorized under a CWA Section 404 permit. INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA
(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)  (Note (2): This exception only applies to the limits of disturbance authorized under the Section 404 permit, and does not apply to any upland portion of the construction project.)
☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail). INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA

Buffer disturbances will occur for the construction of a water-dependent structure or water access
area (e.g., pier, boat ramp, and trail). INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT
WILL OCCUR WITHIN THE BUFFER AREA
(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the

#### 4.2 Perimeter Controls

Template.)

## Instructions (see CGP Parts 2.2.3 and 7.2.6.b.ii):

- Describe sediment controls that will be used (e.g., silt fences, filter berms, temporary diversion dikes, or fiber rolls) to meet the Part 2.2.3 requirement to "install sediment controls along any perimeter areas of the site that will receive pollutant discharges."
- For linear projects, where you have determined that the use of perimeter controls in portions of the site is infeasible, document other practices that you will implement.

## General

• The placement of erosion/sedimentation controls shall be in accordance with the environmental criteria manual and the approved erosion and sedimentation control plan. The placement of tree/natural area protective fencing shall be in accordance with the City of Austin's standard notes for tree and natural area protection and the approved grading/tree and natural area plan.

## **Specific Perimeter Controls**

<b>INSERT NAME O</b>	INSERT NAME OF PERIMETER CONTROL TO BE INSTALLED	
Description: Spe	Description: Specific control devices will include: stabilized construction entrance, silt fence, and	
mulch sock. Silt	mulch sock. Silt fence will be installed perpendicular to down-slopes at locations shown in the	
approved set o	f plans.	
Installation	TBD	
Maintenance Requirements	Maintenance requirements for these controls will be in accordance with the City of Austin's Environmental Criteria Manual. The contractor is required to inspect the controls and fences at daily intervals and after significant rain fall events to insure that they are functioning properly. The person(s) responsible for maintenance of controls and fences shall immediately make any necessary repairs to damaged areas. Silt accumulation at controls must be removed when the depth reaches six (6) inches. Silt accumulation at inlet devices should be removed when the depth reached two (2) inches.	
Design	City of Austin Environmental Criteria Manual (COA ECM)	
Specifications		

[Repeat as needed for individual perimeter controls.]

### 4.3 Sediment Track-Out

# Instructions (see CGP Parts 2.2.4 and 7.2.6.b.iii):

- Describe stormwater controls that will be used to minimize sediment track-out.
- Describe location(s) of vehicle exit(s), procedures to remove accumulated sediment off-site (e.g., vehicle tracking), and stabilization practices (e.g., stone pads or wash racks or both) to minimize off-site vehicle tracking of sediment. Also include the design, installation, and maintenance specifications for each control.

## General

 Contractor to utilize two points of egress/ingress along US Highway 290 at Springdale Road and Chimney Hill.

## **Specific Track-Out Controls**

<b>INSERT NAME O</b>	INSERT NAME OF TRACK-OUT CONTROL TO BE INSTALLED	
Description: Res	strict vehicle use to properly designed exit points that are stabilized with rock per	
detail in plans. F	Remove sediment which has been tracked out by sweeping, shoveling, or	
vacuuming of t	hese surfaces.	
Installation	TBD	
Maintenance Requirements	At a minimum, you must provide for maintenance that meets the following requirement in CGP Part 2.2.4.d: "Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S.")	
Design	COA Environmental Criteria Manual and EPS Requirements	
Specifications	· ·	

[Repeat as needed for individual track-out controls.]

# 4.4 Stockpiled Sediment or Soil

## Instructions (see CGP Parts 2.2.5 and 7.2.6):

- Describe stormwater controls and other measures you will take to minimize the discharge of sediment or soil particles from stockpiled sediment or soil. Include a description of structural practices (e.g., diversions, berms, ditches, storage basins), including design, installation, and maintenance specifications, used to divert flows from stockpiled sediment or soil, retain or detain flows, or otherwise limit exposure and the discharge of pollutants from stockpiled sediment or soil.
- For piles that will be unused for 14 or more days, describe what cover or other appropriate temporary stabilization will be used.
- Also, describe any controls or procedures used to minimize exposure resulting from adding to or removing materials from the pile.

### General

- Daily backfill of trench will minimize stockpile.
- Excavated topsoil may be temporarily stockpiled within the limits of construction. Stockpile areas should be located in an area that does not interfere with construction operations and away from any concentrated flows.

## **Specific Stockpile Controls**

<b>INSERT NAME O</b>	F STOCKPILE CONTROL TO BE INSTALLED	
Description: Top	<b>Description:</b> Topsoil materials will not be placed within the drip lines of trees. Stockpiles should be	
stabilized to minimize erosion and sediment runoff from them. Silt fence must be installed around		
the entire perim	neter of each stockpile immediate after it is stabilized. Any spoils not intended to	
be reused will b	e hauled to an approved disposal site daily.	
Installation	Installation date TBD. Topsoil stockpiling will only occur during grading activities	
	and installation of underground utilities. Silt fence and other required E/S	
	controls must be installed immediately after stockpile is stabilized.	
Maintenance	All stockpiles will be inspected as part of the regular inspection routine.	
Requirements	Maintenance for the BMP will be required on an as-needed basis unless	
	otherwise directed by the Environmental Inspector. Additionally, you must	
	comply with following requirement in CGP Part 2.2.5.d: "You are prohibited	
	from hosing down or sweeping soil or sediment accumulated on pavement or	
	other impervious surfaces into any stormwater conveyance, storm drain inlet, or	
	water of the U.S.")	
Design	City of Austin Environmental Criteria Manual and EPA Requirements	
Specifications		

[Repeat as needed for individual stockpile controls.]

## 4.5 Minimize Dust

### Instructions (see CGP Parts 2.2.6 and 7.2.6):

Describe controls and procedures you will use at your site to minimize the generation of dust.

### General

 Dust control will be performed on an as-needed basis through the application of water and other dust suppression techniques.

## **Specific Dust Controls**

<b>INSERT NAME O</b>	INSERT NAME OF DUST CONTROL TO BE INSTALLED	
Description: Spr	<b>Description:</b> Spraying of potable water will be performed by a mobile pressure distribution truck.	
Installation	TBD – as required	
Maintenance Requirements	All projects approved through the General Permit Program (GPP) must comply with the City of Austin code and Environmental Criteria Manual requirements to control airborne dust. Compliance is required for entire project site as well as associated operations. Contact the GPP Office for recommended control methods.	
Design Specifications	City of Austin Environmental Criteria Manual and EPA Requirements	

[Repeat as needed for individual dust controls.]

## 4.6 Minimize Steep Slope Disturbances

## Instructions (see CGP Parts 2.2.7 and 7.2.6):

- Describe how you will minimize the disturbance to steep slopes (as defined by CGP Appendix A).
- Describe controls (e.g., erosion control blankets, tackifiers), including design, installation and maintenance specifications, that will be implemented to minimize sediment discharges from slope disturbances.

#### General

• N/A - There are steep slopes within the limits of construction for this project; however, we are not disturbing them.

## **Specific Steep Slope Controls**

INSERT NAME OF STEEP SLOPE CONTROL TO BE INSTALLED	
Description: INSERT DESCRIPTION OF STEEP SLOPE CONTROL TO BE INSTALLED	
Installation	INSERT APPROXIMATE DATE OF INSTALLATION
Maintenance	INSERT MAINTENANCE REQUIREMENTS FOR THE STEEP SLOPE CONTROL
Requirements	
Design	INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE
Specifications	

[Repeat as needed for individual steep slope controls.]

# 4.7 Topsoil

## Instructions (see CGP Parts 2.2.8 and 7.2.6):

- Describe how topsoil will be preserved and identify these areas and associated control measures on your site map(s).
- If it is infeasible for you to preserve topsoil on your site, provide an explanation for why
  this is the case.

### **Generals**

Disturbed areas will require temporary or permanent stabilizations.

### **Specific Topsoil Controls**

INSERT NAME OF TOPSOIL CONTROL TO BE INSTALLED			
Description: Ten	<b>Description:</b> Temporary soil stabilization will be protected by re-vegetation mulch. If a disturbed		
area is not to be	area is not to be worked for more than five (5) days then temporary stabilization is required.		
Temporary soil s	Temporary soil stabilization will be protected by re-vegetation mulch. Permanent soil stabilization		
will be achieved	will be achieved by seeding and sodding.		
Installation	TBD		
Maintenance	The contractor is required to inspect the controls and fences at daily intervals		
Requirements	and after significant rainfall events.		
Design	City of Austin Environmental Criteria Manual		
Specifications			

[Repeat as needed for individual topsoil controls.]

## 4.8 Soil Compaction

## Instructions (see CGP Parts 2.2.9 and 7.2.6):

 In areas where final vegetative stabilization will occur or where infiltration practices will be installed, describe the controls, including design, installation, and maintenance specifications that will be used to restrict vehicle or equipment access or condition the soil for seeding or planting.

#### General

Restrict vehicle/equipment use where top soil is disturbed.

# **Specific Soil Compaction Controls**

INSERT NAME OF SOIL COMPACTION CONTROL TO BE INSTALLED	
<b>Description:</b> Restrict vehicle/equipment use where top soil is disturbed.	
Installation	N/A
Maintenance	Throughout the construction of the project.
Requirements	
Design	N/A
Specifications	

### 4.9 Storm Drain Inlets

# Instructions (see CGP Parts 2.2.10 and 7.2.6):

 Describe controls (e.g., inserts, rock-filled bags, or block and gravel) including design, installation, and maintenance specifications that will be implemented to protect all inlets that carry stormwater flow from your site to a water of the U.S., provided you have the authority to access the storm drain inlet.

### General

N/A - There are no proposed storm drain inlets within the scope of this project.

## **Specific Storm Drain Inlet Controls**

INSERT NAME OF STORM DRAIN INLET CONTROL TO BE INSTALLED		
Description: N/A	Description: N/A	
Installation	N/A	
Maintenance Requirements	N/A (Note: At a minimum, you must comply with following requirement in CGP Part 2.2.10.b: "Clean, or remove and replace the protection measures as	
Requirements	sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.")	
Design	N/A	
Specifications		

[Repeat as needed for individual storm drain inlet controls.]

## 4.10 Stormwater Conveyance Channels

## Instructions (see CGP Parts 2.2.11 and 7.2.6):

If you will be installing a stormwater conveyance channel, describe control practices (e.g., velocity dissipation devices), including design specifications and details (volume, dimensions, outlet structure), that will be implemented at the construction site.

## General

N/A - There are no proposed stormwater conveyance channels within the scope of this project.

## **Specific Conveyance Channel Controls**

INSERT NAME OF CONVEYANCE CHANNEL CONTROL TO BE INSTALLED	
Description: N/A	
Installation	N/A
Maintenance	N/A
Requirements	
Design	N/A
Specifications	

[Repeat as needed for individual stormwater conveyance channel controls.]

### 4.11 Sediment Basins

## Instructions (see CGP Parts 2.2.12 and 7.2.6.b.iv):

If you will install a sediment basin, include design specifications and other details (volume, dimensions, outlet structure) that will be implemented in conformance with CGP Part 2,2.12.

- Sediment basins must be situated outside waters of the U.S. and any natural buffers established under CGP Part 2.2.1; and designed to avoid collecting water from wetlands.
- At a minimum, sediment basins provide storage for either (1) the calculated volume of runoff from the 2-year, 24-hour storm (see CGP App. H), or (2) 3,600 cubic feet per acre drained
- Sediment basins must also utilize outlet structures that withdraw water from the surface, unless infeasible

#### General

N/A - There are no proposed sediment basins within the scope of this project.

### **Specific Sediment Basin Controls**

INSERT NAME OF SEDIMENT BASIN CONTROL TO BE INSTALLED		
Description: N/	Description: N/A	
Installation	N/A	
Maintenance Requirements	N/A INSERT MAINTENANCE REQUIREMENTS FOR THE SEDIMENT BASIN CONTROL. (Note: At a minimum, you must comply with following requirement in CGP Part 2.2.12.f: "Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.")	
Design	N/A	
Specifications		

[Repeat as needed for individual sediment basin controls.]

#### 4.12 Chemical Treatment

## Instructions (see CGP Parts 2.2.13 and 7.2.6.v):

If you are using treatment chemicals at your site, provide details for each of the items below. This information is required as part of the SWPPP requirements in CGP Part 7.2.6.v.

### **Soil Types**

List all the soil types (including soil types expected to be found in fill material) that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems: N/A

## **Treatment Chemicals**

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics: N/A

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage: N/A

Provide information from any applicable Safety Data Sheets (SDS): N/A

Describe how each of the chemicals will stored: N/A

Include references to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems: N/A

## Special Controls for Cationic Treatment Chemicals (if applicable)

If the applicable EPA Regional Office authorized you to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards: INSERT (1) ANY LETTERS OR OTHER DOCUMENTS SENT FROM THE EPA REGIONAL OFFICE CONCERNING YOUR USE OF CATIONIC TREATMENT CHEMICALS, AND (2) DESCRIPTION OF ANY SPECIFIC CONTROLS YOU ARE REQUIRED TO IMPLEMENT

## Schematic Drawings of Stormwater Controls/Chemical Treatment Systems

Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals: N/A

# **Training**

Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals: N/A

## 4.13 Dewatering Practices

## Instructions (see CGP Parts 2.4 and 7.2.6):

If you will be discharging ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, include design specifications and details of all dewatering practices that are installed and maintained to comply with CGP Part 2.4.

**General:** No dewatering is anticipated for the project. However, the Contractor is responsible for dewatering of work area, contractor must secure City of Austin approval of proposed dewatering procedures prior to installation or use.

### **Specific Dewatering Practices**

INSERT NAME OF DEWATERING PRACTICE TO BE INSTALLED		
Description: N/A		
Installation	N/A	
Maintenance	N/A (Note: At a minimum, you must comply with following requirement in CGP	
Requirements	Part 2.4: "With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.")	
Design	N/A	
Specifications		

### 4.14 Other Stormwater Controls

### Instructions:

Describe any other stormwater controls that do not fit into the above categories.

### General

This project does not propose to install any other stormwater controls.

## **Specific Stormwater Control Practices**

INSERT NAME OF OTHER STORMWATER CONTROLE TO BE INSTALLED		
Description: N/A		
Installation	N/A	
Maintenance	N/A	
Requirements		
Design	N/A	
Specifications		

#### 4.15 Site Stabilization

### Instructions (see CGP Parts 2.2.14 and 7.2.6.vi):

The CGP requires you to immediately initiate stabilization when work in an area of your site has permanently or temporarily stopped, and to complete certain stabilization activities within prescribed deadlines. Construction projects disturbing more than 5 acres at any one time have a different deadline than projects disturbing 5 acres or less at any one time. See CGP Part 2.2.14.a. The CGP also requires that stabilization measures meet certain minimum criteria. See CGP Part 2.2.14.b. For your SWPPP, you must include the following:

- Describe the specific vegetative and/or non-vegetative practices that will be used to stabilize exposed soils where construction activities have temporarily or permanently ceased. Avoid using impervious surfaces for stabilization whenever possible.
- The stabilization deadline(s) that will be met in accordance with Part 2.2.14.a
- Once you begin construction, consider using the Grading/Stabilization Activities log in Appendix H of the Template to document your compliance with the stabilization requirements in CGP Part 2.2.14.

# Total Amount of Land Disturbance Occurring at Any One Time

Five Acres or less

☐ More than Five Acres

## Use this template box if you are <u>not</u> located in an arid, semi-arid, or drought-stricken area

INSERT NAME OF SITE STABILIZATION PRACTICE
☐ Temporary ⊠ Permanent
Description:

- Revegetation by sod
   Revegetation within managed turf areas will be accomplished through the installation of
- solid block grass sod. The sod type will match adjacent grass type.

  Revegetation by seeding
- Vegetation will prevent erosion of sediment. Contractor must:
  - 1. Initiate the installation of stabilization measures immediate for the following activities:
    - a. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative products takes place as soon as practicable but no later than one (1) calendar day of completing soil preparation
    - b. Applying mulch or other non-vegetative product to the exposed area
    - c. Seeding or planting the exposed area
    - d. Starting any of the activities in numbers -3 on a portion of the entire area that will be stabilized
    - e. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization. IN any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days. Note: The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently c eased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.
  - 2. Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated.

Installation	TBD		
Completion	TBD		
Maintenance	Maintenance is a vital factor in providing an adequate vegetative erosion		
Requirements	Maintenance is a vital factor in providing an adequate vegetative erosion control cover. Monitoring, watering, mulching, and weeding shall be required during the period of establishment to ensure planting success. Maintenance practices shall comply with construction methods and plant establishment requirements described in City of Austin Standard Specifications 604S, 608S, and 609S.  a. Reseeding – inspect all seeded areas for failure and reseed as necessary per 609S.  b. Replanting – Failure of rooted plant requires replacement per Standard Specification 608S.  c. Weeding – Anticipate weed problems prior to planting desired plants and control weeds as necessary to curb competition and enable proposed vegetation to thrive. Weed types and amounts are dependent on weather, season, soil quality, and site conditions. Refer to City of Austin Standard Specifications 604 and 609 for weed lists. Treatment methods shall be tailored for each situation and should follow current City of Austin Integrated Pest Management (IPM) guidelines and Invasive Species Management Plan.  Site stabilization should be in compliance with City of Austin Environmental		
Dasign			
Design Specifications	Criteria Manual 1.4.7 Vegetative Practices.		
specifications	Ciliena Manuai 1.4./ vegetative flactices.		

[Repeat as needed for additional stabilization practices.]

Use this template box if you are located in an arid, semi-arid, or drought-stricken area.

<b>INSERT NAME O</b>	F SITE STABILIZATION PRACTICE		
☐ Vegetative	□ Non-Vegetative		
☐ Temporary	$\square$ Temporary $\square$ Permanent		
Description:			
■ INSERT D	DESCRIPTION OF STABILIZATION PRACTICE TO BE INSTALLED		
<ul> <li>NOTE HO</li> </ul>	DW DESIGN WILL MEET REQUIREMENTS OF PART 2.2.14.b		
Dry Period	<ul> <li>Beginning date of seasonally dry period: INSERT APPROXIMATE DATE</li> </ul>		
	<ul> <li>Ending date of seasonally dry period: INSERT APPROXIMATE DATE</li> </ul>		
	<ul> <li>Site conditions during this period: DESCRIBE YOUR SITE CONDITIONS DURING</li> </ul>		
	THIS PERIOD		
Installation	DESCRIBE THE SCHEDULE YOU WILL FOLLOW FOR INITIATING AND COMPLETING		
and	VEGETATIVE STABILIZATION		
completion	<ul> <li>Approximate installation date: INSERT APPROXIMATE DATE</li> </ul>		
schedule	<ul> <li>Approximate completion date: INSERT APPROXIMATE DATE</li> </ul>		
Maintenance	INSERT MAINTENANCE REQUIREMENTS FOR THE STABILIZATION PRACTICE		
Requirements			
Design	INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE		
Specifications			

Use this template box if unforeseen circumstances have delayed the initiation and/or completion of vegetative stabilization. Note: You will not be able to include this information in your initial SWPPP. If you are affected by circumstances such as those described in CGP Part 2.2.14.a.iii, you will need to modify your SWPPP to include this information.

<b>INSERT NAME O</b>	F SITE STABILIZATION PRACTICE		
☐ Vegetative			
☐ Temporary	☐ Permanent		
Description:			
■ INSERT D	DESCRIPTION OF STABILIZATION PRACTICE TO BE INSTALLED		
<ul> <li>NOTE HO</li> </ul>	OW DESIGN WILL MEET REQUIREMENTS OF PART 2.2.14.b		
Justification	INSERT DESCRIPTION OF CIRCUMSTANCES THAT PREVENT YOU FROM MEETING		
	THE DEADLINES REQUIRED IN CGP PARTS 2.2.14.a		
Installation	Vegetative Measures:		
and	DESCRIBE THE SCHEDULE YOU WILL FOLLOW FOR INITIATING AND COMPLETING		
completion	VEGETATIVE STABILIZATION		
schedule	<ul> <li>Approximate installation date: INSERT APPROXIMATE DATE</li> </ul>		
	<ul> <li>Approximate completion date: INSERT APPROXIMATE DATE</li> </ul>		
	Non-Vegetative Measures:		
	(must be completed within 14 days of the cessation of construction if disturbing		
	5 acres or less; within 7 days if disturbing more than 5 acres)		
	<ul> <li>Approximate installation date: INSERT APPROXIMATE DATE</li> </ul>		
	Approximate completion date: INSERT APPROXIMATE DATE		
Maintenance	INSERT MAINTENANCE REQUIREMENTS FOR THE STABILIZATION PRACTICE		
Requirements			
Design	INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE		
Specifications			

### **SECTION 5: POLLUTION PREVENTION STANDARDS**

## 5.1 Potential Sources of Pollution

## Instructions (see CGP Part 7.2.3.g):

- Identify and describe all pollutant-generating activities at your site (e.g., paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal).
- For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents associated with that activity (e.g., sediment, fertilizers, and/or pesticides, paints, solvents, fuels), which could be exposed to rainfall or snowmelt, and could be discharged from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction.

### **Construction Site Pollutants**

Pollutant-Generating Activity	Pollutants or Pollutant Constituents (that could be discharged if exposed to stormwater)	Location on Site (or reference SWPPP site map where this is shown)
Excavation	Sedimentation / Oil	Within LOC
Dust Control	Sedimentatin / Oil / Trash	Within LOC
Utility Trench Stockpiles	Sedimentation / Oil	With LOC
Right of Way Preparation	Sedimentation / Oil	US 290 at Springdale Road and Chimney Hill, Sansom Road, Ferguson Lane, E-K Lane, Quiette Drive, Carla Drive, and Vara Drive

# 5.2 Spill Prevention and Response

## Instructions (see CGP Parts 2.3.6 and 7.2.6.vii):

- Describe procedures you will use to prevent and respond to leaks, spills, and other releases. You must implement the following at a minimum:
  - ✓ Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or title of the employee(s) responsible for detection and response of spills or leaks; and
  - ✓ Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available.
- Some projects/site may be required to develop a Spill Prevention Control and Countermeasure (SPCC) plan under a separate regulatory program (40 CFR 112). If you are required to develop an SPCC plan, or you already have one, you should include references to the relevant requirements from your plan.

Clean up leaks, spills, and other releases or contaminated surfaces immediately, using dry clean up measures where possible. Eliminate the source of the spill to prevent a discharge or further ongoing discharge. Do not clean surfaces by hosing the area down.

### 5.3 Fueling and Maintenance of Equipment or Vehicles

#### Instructions (see CGP Parts 2.3.1 and 7.2.6):

 Describe equipment/vehicle fueling and maintenance practices that will be implemented to eliminate the discharge of spilled or leaked chemicals (e.g., providing secondary containment (examples: spill berms, decks, spill containment pallets) and cover where appropriate, and/or having spill kits readily available.)

### General

- Minor maintenance allowed on-site within staging area. All major maintenance should be conducted off site.
- All fueling and maintenance should be conducted off site.
  - 1. Fuel storage is prohibited on this project
  - 2. The contractor is required to notify the General Permit Program (GPP) Office immediate following any spill of fuel or other toxic material. Contractor is required to follow-up with written documentation, including a complete description of the incident, material spilled, and actions taken to contain and clean up material.

## **Specific Pollution Prevention Practices**

# **Pollution Prevention Practice 1**

**Description:** Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquid.

- 1. Use drip pans and absorbents under or around leaky vehicles
- 2. Dispose of or recycle oil wastes in accordance with City of Austin requirements

3. Clean up leaks, spills, and other releases or contaminated surfaces immediately, using dry clean up measures where possible. Eliminate the source of the spill to prevent a discharge or further ongoing discharge. Do not clean surfaces by hosing the area down.		
Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	Notify the General Permit Program (GPP) Office immediately following any spill	
Specifications	of fuel or other toxic material.	

## 5.4 Washing of Equipment and Vehicles

### Instructions (see CGP Parts 2.3.2 and 7.2.6):

- Describe equipment/vehicle washing practices that will be used to minimize the
  discharge of pollutants from equipment and vehicle washing, wheel wash water, and
  other types of wash waters (e.g., locating activities away from waters of the U.S. and
  stormwater inlets or conveyances and directing wash waters to a sediment basin or
  sediment trap, using filtration devices, such as filter bags or sand filters, or using other
  similarly effective controls).
- Describe how you will prevent the discharge of soaps, detergents, or solvents by providing either (1) cover (examples: plastic sheeting or temporary roofs) to prevent these detergents from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas.

## General

- Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of washing.
- When necessary, vehicle wheel shall be cleaned to remove sediment prior to entrance onto public roadway. When washing is required, it shall be done on an area stabilized with crushed stone and drain into an approved trap. All sediment will be prevented from entering the watercourse using approved method.

## **Specific Pollution Prevention Practices**

INSERT NAME OF POLLUTION PREVENTION PRACTICE		
<b>Description:</b> For storage soaps, detergents, or solvents contractor must provide: a cover (e.g. plastic sheeting or temporary roof(s) to prevent these detergents from coming into contact with rainwater.		
Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	
Specifications		

# 5.5 Storage, Handling, and Disposal of Building Products, Materials, and Wastes

# Instructions (see CGP Parts 2.3.3 and 7.2.6):

For any of the types of building products, materials, and wastes below in Sections 5.5.1 5.5.6 below that you expect to use or store at your site, provide the information on how you will comply with the corresponding CGP provision and the specific practices that you will be employ.

## 5.5.1 Building Products

(Note: Examples include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.)

#### General

N/A

### **Specific Pollution Prevention Practices**

N/A		
Description: N/A		
Installation	N/A	
Maintenance	N/A	
Requirements		
Design	N/A	
Design Specifications		

### 5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

# General

Minimize discharges of fertilizers containing nitrogen or phosphorus into stormwater.

### **Specific Pollution Prevention Practices**

Pollution Prevention Practice 1			
Description: In s	<b>Description:</b> In storage area contractor must provide: a cover (e.g. plastic sheeting or		
temporary roof(s) to prevent these chemicals from coming into contact with rainwater or a			
similarly effective	similarly effective means designed to prevent the discharge of pollutants from these areas.		
Installation	TBD		
Maintenance	As necessary		
Requirements			
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE		
Specifications			

## 5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

## General

• Fuel storage is prohibited on this project.

# **Specific Pollution Prevention Practices**

Pollution	Prevention	Practice 1
Pollution	rrevention	Practice i

**Description:** Store chemicals in water-tight containers and provide either a cover (e.g. plastic sheeting or temporary roof(s) to prevent these chemicals from coming into contact with rainwater or a similarly effective means designed to prevent the discharge of pollutants from these areas or provide secondary containment (e.g. spill berms, decks, spill containment pallets). Clean up spills immediately, using dry clean up measures where possible and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge. Do not clean surfaces by hosing the area down.

Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	
Specifications		

#### 5.5.4 Hazardous or Toxic Waste

(Note: Examples include paints, solvents, petroleum-based products, wood preservatives, additives, curing compounds, acids.)

#### General

Separate hazardous or toxic waste from construction and domestic waste.

#### Specific Pollution Prevention Practices

## **Pollution Prevention Practice 1**

**Description:** Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCA) requirement and all other applicable federal, state, tribal, or local requirements.

- Store all containers that will be stored outside within appropriately-sized secondary containments (e.g. spill berm, deck, spill containment pallet(s) to prevent spills from being discharge, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas.
- Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirement.
- Clean up spills immediately, using dry clean up measures where possible and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge. Do not clean surfaces by hosting the area down.

Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	
Specifications		

#### 5.5.5 Construction and Domestic Waste

(Note: Examples include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials.)

#### General

 Waste associated with the maintenance vehicles and equipment must be stored in proper containers until removed from the project site.

## **Specific Pollution Prevention Practices**

Pollution Prevention Practice 1		
<b>Description:</b> On work days, clean up and dispose of waste in designated waste containers and clean up immediately if containers overflow. Spill kits and clean up materials must be available on site at all times.		
Installation	TBD	
Maintenance Requirements	Vehicles and equipment should be inspected daily for leaks. Any vehicles and equipment found to have leaks shall be repaired immediately or removed from the project site.	
Design Specifications	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	

### 5.5.6 Sanitary Waste

### General

Position portable toilets so that they are secure and will not be tipped or knocked over.

## **Specific Pollution Prevention Practices**

Pollution Prevention Practice 1			
<b>Description:</b> Position portable toilets so that they are secure and will not be tipped or knocked			
over.			
Installation	TBD		
Maintenance	As necessary.		
Requirements			
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE		
Specifications			

## 5.6 Washing of Applicators and Containers used for Paint, Concrete or Other Materialss

## Instructions (see CGP Parts 2.3.4 and 7.2.6):

 Describe how you will comply with the CGP Part 2.3.4 requirement for washing applications and containers.

#### General

Collect and retain all concrete washout water and solid in leak-proof container.

# **Specific Pollution Prevention Practices**

## **Pollution Prevention Practice 1**

### **Description:**

- Direct all wash water in to a leak-proof container or leak-proof pit. The container or pit
  must be designed so that no overflows can occur due to inadequate sizing or
  precipitation.
- Do not dump liquid waste in storm sewers.
- Remove and dispose of hardened concrete waste consistent with the handling of other construction waste.

•	Locate any washout or clean out activities as far away as possible from surface waters
	and stormwater inlet or conveyance, and, to the extent practicable, designated areas
	to be used for these activies and conduct such activities only in these areas.

• Recycle 100% percent concrete washout and solid.

Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	
<b>Specifications</b>		

#### 5.7 Fertilizers

### Instructions (CGP Parts 2.3.5 and 7.2.6.ix):

Describe how you will comply with the CGP Part 2.3.5 requirement for the application of fertilizers.

#### General

 Fertilizer type and rate of application should be based on chemical test of representative's soil sample after completion of construction and ground work and in compliance with City of Austin requirement.

## **Specific Pollution Prevention Practices**

## **Pollution Prevention Practice 1**

### **Description:**

- Never apply to frozen ground.
- Never apply to stormwater conveyance channels with flowing water.
- Follow all other federal, state, tribal, and local requirement regarding fertilizer application.
- Apply at the appropriate time of year for construction location and preferably timed to coincide as closely as possible to the period of maximum vegetation up take and growth.
- Avoid applying before heavy rains that could cause excess nutrients to be discharged.

Installation	TBD	
Maintenance	As necessary	
Requirements		
Design	IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE	
Specifications		

## 5.8 Other Pollution Prevention Practices

### Instructions:

Describe any additional pollution prevention practices that do not fit into the above categories.

### General

N/A

# **Specific Pollution Prevention Practices**

N/A	
Description: N/A	
Installation	N/A
Maintenance	N/A
Requirements	
Design	N/A
Specifications	

# SECTION 6: INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

## 6.1 Inspection Personnel and Procedures

#### Instructions (see CGP Parts 3.2, 4, 5, and 7.2.7):

Describe the procedures you will follow for conducting inspections in accordance with CGP Parts 3.2, 4, 5, and 7.2.7.

The contractor is required to inspect the controls and fences at daily intervals and after significant rainfall events to ensure that they are functioning properly. The person(s) responsible for maintenance of controls and fences shall immediately make any necessary repairs to damaged areas. Silt accumulation at controls must be removed when the depth reaches six (6) inches.

#### Personnel Responsible for Inspections

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL WHO WILL BE CONDUCTING SITE INSPECTIONS HERE

Note: All personnel conducting inspections must be considered a "qualified person." CGP Part 4.1 clarifies that a "qualified person" is a person knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

## **Inspection Schedule**

Select the inspection frequency (ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4 (Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply)

Standard Frequency:	
The contractor is required to inspect the controls and fences at daily in significant rainfall events to ensure that they are functioning proper responsible for maintenance of controls and fences shall immedia repairs to damaged areas. Silt accumulation at controls must be reaches six (6) inches. Silt accumulation at inlet devices should be depth reaches two (2) inches.	erly. The person(s) tely make any necessary emoved when the depth
☐ Every 7 days	

Every 14 days and within 24 hours of a 0.25" rain or the occurrence of runoff from snowmelt sufficient to cause a discharge		
Increased Frequency (if applicable):		
For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3		
□ Every 7 days and within 24 hours of a 0.25" rain		
Reduced Frequency (if applicable)		
For stabilized areas		
☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month;		
<ul> <li>SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED</li> <li>INSERT DATE THAT THEY WERE COMPLETED</li> </ul>		
(Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information.)		
For stabilized areas on "linear construction sites"		
☐ Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a 0.25" rain		
<ul> <li>SPECIFY LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED</li> <li>INSERT DATE THAT THEY WERE COMPLETED</li> </ul>		
(Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information.)		
For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought		
☐ Once per month and within 24 hours of a 0.25" rain		
Insert beginning and ending dates of the seasonally-defined dry period for your area or the valid period of drought:		
<ul> <li>Beginning date of seasonally dry period: INSERT APPROXIMATE DATE</li> <li>Ending date of seasonally dry period: INSERT APPROXIMATE DATE</li> </ul>		
For frozen conditions where earth-disturbing activities are being conducted		
☐ Once per month		
Insert beginning and ending dates of frozen conditions on your site:  • Beginning date of frozen conditions: INSERT APPROXIMATE DATE  • Ending date of frozen conditions: INSERT APPROXIMATE DATE		

Rain Gauge Location (if applicable)

SPECIFY LOCATION(S) OF RAIN GAUGE TO BE USED FOR DETERMINING WHETHER A RAIN EVENT OF 0.25 INCHES OR GREATER HAS OCCURRED (only applies to inspections conducted for Part 4.2.2, 4.3, or 4.4.2)

# **Inspection Report Forms**

See Appendix D & E

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at <a href="https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources">https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources</a>)

#### 6.2 Corrective Action

### Instructions (CGP Parts 5 and 7.2.7):

Describe the procedures for taking corrective action in compliance with CGP Part 5.

Field revisions to the E/S controls plan may be required by the General Permit Program (GPP) Representative during the course of construction to correct control inadequacies. Any revision to the permit plan must be approved by the General Permit Program Office of the Development Services Department.

### **Personnel Responsible for Corrective Actions**

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL RESPONSIBLE FOR CORRECTIVE ACTIONS

#### **Corrective Action Forms**

INSERT A COPY OF ANY CORRECTIVE ACTION FORMS YOU WILL USE HERE OR IN APPENDIX E OF THIS SWPPP TEMPLATE

(Note: EPA has developed a sample corrective action form that CGP operators can use. The form is available at <a href="https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources">https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources</a>)

See Appendix D & E

## 6.3 Delegation of Authority

### Instructions:

- Identify the individual(s) or positions within the company who have been delegated authority to sign inspection reports.
- Attach a copy of the signed delegation of authority (see example in Appendix J of the Template.)
- For more on this topic, see Appendix I, Subsection 11 of EPA's CGP.

# Duly Authorized Representative(s) or Position(s):

Insert Company or Organization Name

Insert Name

**Insert Position** 

**Insert Address** 

Insert City, State, Zip Code

Insert Telephone Number

Insert Fax/Email

### **SECTION 7: TRAINING**

### Instructions (see CGP Part 6 and 7.2.8):

- Complete the table below to provide documentation that the personnel required to be trained in CGP Part 6 completed the appropriate training
- If personnel will be taking course training (which is not required as part of the CGP),
   consider using Appendix I of this SWPPP template to track completion of this training
- The following personnel, at a minimum, must receive training, and therefore should be listed out individually in the table below:
  - ✓ Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention measures);
  - ✓ Personnel responsible for the application and storage of treatment chemicals (if applicable);
  - ✓ Personnel who are responsible for conducting inspections as required in Part 4.1; and
  - ✓ Personnel who are responsible for taking corrective actions as required in Part 5.
- CGP Part 6 requires that the required personnel must be trained to understand the following if related to the scope of their job duties:
  - ✓ The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
  - ✓ The location of all stormwater controls on the site required by this permit, and how they are to be maintained;
  - ✓ The proper procedures to follow with respect to the permit's pollution prevention requirements; and
  - ✓ When and how to conduct inspections, record applicable findings, and take corrective actions.

Table 7-1: Documentation for Completion of Training

Name	Describe Training	Date Training Completed
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE
INSERT NAME OF PERSONNEL		INSERT COMPLETION DATE

# **SECTION 8: CERTIFICATION AND NOTIFICATION**

# Instructions (CGP Appendix I, Part I.11.b):

- The following certification statement must be signed and dated by a person who meets the requirements of Appendix I, Part I.11.b.
- This certification must be re-signed in the event of a SWPPP Modification.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name:	Title:	
Signature:	Date:	

[Repeat as needed for multiple construction operators at the site.]

# **SWPPP APPENDICES**

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B - Copy of 2017 CGP

Appendix C – NOI TPDES General Permit

Appendix D & E – Inspection Form and Corrective Action Form

Appendix F - SWPPP Amendment Log

Appendix G - Subcontractor Certifications/Agreements

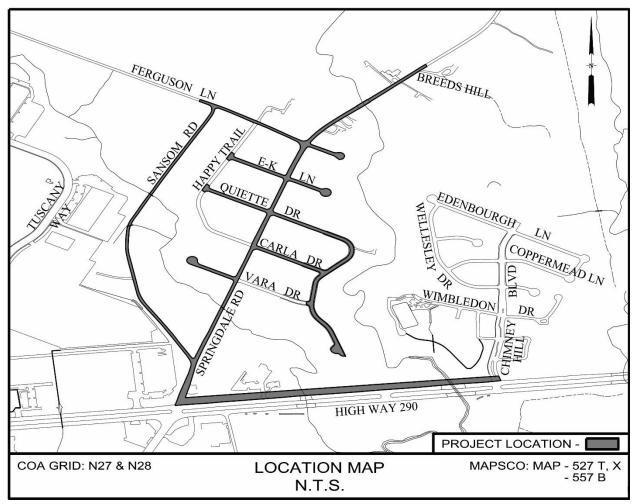
Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Log

Appendix J – Delegation of Authority

Appendix K & L- Endangered Species Documentation and Historic Properties Documentation

# Appendix A – Site Maps



Appendix B - Copy of 2017 CGP

# National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) general permit, are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on February 16, 2017.

Signed and issued this 11th day of January 2017

Director, Water Division, EPA Region 5

Christopher Korleski,

This permit and the authorization to discharge expire at 11:59pm, February 16, 2022.

Signed and issued this 11 <sup>th</sup> day of January 2017  Deborah Szaro,  Acting Regional Administrator, EPA Region 1	Signed and issued this 11 <sup>th</sup> day of January 2017 William K. Honker, P.E., Director, Water Division, EPA Region 6
Signed and issued this 11 <sup>th</sup> day of January 2017 Javier Laureano, Ph.D., Director, Clean Water Division, EPA Region 2	Signed and issued this 11 <sup>th</sup> day of January 2017  Karen Flournoy, Director, Water, Wetlands, and Pesticides Division, EPA Region 7
Signed and issued this 11 <sup>th</sup> day of January 2017  Jose C. Font, Acting Director, Caribbean Environmental Protection Division, EPA Region 2.	Signed and issued this 11 <sup>th</sup> day of January 2017  Darcy O'Connor,  Assistant Regional Administrator, Office of Water  Protection, EPA Region 8
Signed and issued this 11 <sup>th</sup> day of January 2017 Dominique Lueckenhoff, Acting Director, Water Protection Division, EPA Region 3	Signed and issued this 11 <sup>th</sup> day of January 2017 Kristin Gullatt Deputy Director, Water Division, EPA Region 9
Signed and issued this 11 <sup>th</sup> day of January 2017 César A. Zapata, Deputy Director, Water Protection Division, EPA Region 4	Signed and issued this 11 <sup>th</sup> day of January 2017  Daniel D. Opalski,  Director, Office of Water and Watersheds, EPA  Region 10

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# 1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

#### 1.1 ELIGIBILITY CONDITIONS

- 1.1.1 You are an "operator" of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an "operator" is any party associated with a construction project that meets either of the following two criteria:
  - a. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g., in most cases this is the owner of the site); or
  - b. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this is the general contractor (as defined in Appendix A) of the project).

Where there are multiple operators associated with the same project, all operators must obtain permit coverage. Subcontractors generally are not considered operators for the purposes of this permit.

- **1.1.2** Your site's construction activities:
  - Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale that will ultimately disturb one or more acres of land; or
  - b. Have been designated by EPA as needing permit coverage under 40 CFR 122.26(a)(1)(v) or 40 CFR 122.26(b)(15)(ii);
- 1.1.3 Your site is located in an area where EPA is the permitting authority (see Appendix B);
- **1.1.4** Discharges from your site are not:
  - a. Already covered by a different NPDES permit for the same discharge; or
  - b. In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.<sup>2,3</sup>
- 1.1.5 You are able to demonstrate that you meet one of the criteria listed in Appendix D with respect to the protection of species that are federally listed as endangered or threatened under the Endangered Species Act (ESA) and federally designated critical habitat:

<sup>&</sup>lt;sup>1</sup> If the operator of a "construction support activity" (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of liability between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

<sup>&</sup>lt;sup>2</sup> Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2012 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

<sup>&</sup>lt;sup>3</sup> Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

- **1.1.6** You have completed the screening process in Appendix E relating to the protection of historic properties; and
- 1.1.7 You have complied with all requirements in Part 9 imposed by the applicable state, Indian tribe, or territory in which your construction activities and/or discharge will occur.
- 1.1.8 For "new sources" (as defined in Appendix A) only:
  - a. EPA has not, prior to authorization under this permit, determined that discharges from your site will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that will not cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard.
  - b. Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water<sup>4</sup> will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.
- 1.1.9 If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your Notice of Intent (NOI) unless and until you notify your applicable EPA Regional Office (see Appendix L) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to discharges that cause an exceedance of water quality standards.

# 1.2 TYPES OF DISCHARGES AUTHORIZED<sup>5</sup>

1.2.1 The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):

a. Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR 122.26(b)(14) or 122.26(b)(15)(i);

<sup>&</sup>lt;sup>4</sup> Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water to which you discharge is identified by a state, tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

<sup>&</sup>lt;sup>5</sup> See "Discharge" as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

- b. Stormwater discharges designated by EPA as needing a permit under 40 CFR 122.26(a)(1)(v) or 122.26(b)(15)(ii);
- c. Stormwater discharges from construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:
  - i. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
  - ii. The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites:
  - iii. The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and
  - iv. Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas.
- d. Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.
- 1.2.2 The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:
  - a. Discharges from emergency fire-fighting activities;
  - b. Fire hydrant flushings;
  - c. Landscape irrigation;
  - d. Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
  - e. Water used to control dust:
  - f. Potable water including uncontaminated water line flushings;
  - g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) (e.g., paint or caulk containing polychlorinated biphenyls (PCBs));
  - h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any water of the U.S., storm drain inlet, or stormwater conveyance, unless the conveyance is connected to a sediment basin, sediment trap, or similarly effective control;
  - i. Uncontaminated air conditioning or compressor condensate;
  - j. Uncontaminated, non-turbid discharges of ground water or spring water;
  - k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and
  - I. Construction dewatering water discharged in accordance with Part 2.4.

1.2.3 Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

# 1.3 PROHIBITED DISCHARGES<sup>6</sup>

- **1.3.1** Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4:
- **1.3.2** Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
- **1.3.3** Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- **1.3.4** Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and
- **1.3.5** Toxic or hazardous substances from a spill or other release.

To prevent the above-listed prohibited non-stormwater discharges, operators must comply with the applicable pollution prevention requirements in Part 2.3.

# 1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)

All "operators" (as defined in Appendix A) associated with your construction site, who meet the Part 1.1 eligibility requirements, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in **Table 1** prior to commencing construction activities.

**Exception:** If you are conducting construction activities in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency.

# 1.4.1 Prerequisite for Submitting Your NOI

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

# 1.4.2 How to Submit Your NOI

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2017 CGP, unless you received a waiver from your EPA Regional Office.

To access NeT, go to <a href="https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting">https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting</a>.

<sup>&</sup>lt;sup>6</sup> EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

Waivers from electronic reporting may be granted based on one of the following conditions:

- a. If your operational headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or
- b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix J.

# 1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.

Type of Operator	NOI Submittal Deadline <sup>7</sup>	Permit Authorization Date <sup>8</sup>
Operator of a new site (i.e., a site where construction activities commence on or after February 16, 2017)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI,
Operator of an existing site (i.e., a site with 2012 CGP coverage where construction activities commenced prior to February 16, 2017)	No later than <b>May 17, 2017</b> .	unless EPA notifies you that your authorization is delayed or denied.
New operator of a permitted site (i.e., an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site")	At least 14 calendar days before the date the transfer to the new operator will take place.	
Operator of an "emergency-related project" (i.e., a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

<sup>&</sup>lt;sup>7</sup> If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

<sup>&</sup>lt;sup>8</sup> Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

# 1.4.4 Modifying your NOI

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix J.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

# 1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

- a. You terminate permit coverage consistent with Part 8; or
- b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2022; or
- c. You fail to submit an NOI for coverage under a revised or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

# 1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way.<sup>9</sup> At a minimum, the notice must include:

- a. The NPDES ID (i.e., permit tracking number assigned to your NOI);
- b. A contact name and phone number for obtaining additional construction site information;
- c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [include the appropriate CGP Regional Office contact information found at <a href="https://www.epa.gov/npdes/contact-us-stormwater#regional">https://www.epa.gov/npdes/contact-us-stormwater#regional</a>];" and
- d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations."

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<sup>&</sup>lt;sup>9</sup> If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

# 2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.<sup>10</sup>

# 2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS

You must design, install, and maintain stormwater controls required in Parts 2.2 and 2.3 to minimize the discharge of pollutants in stormwater from construction activities. To meet this requirement, you must:

# 2.1.1 Account for the following factors in designing your stormwater controls:

- a. The expected amount, frequency, intensity, and duration of precipitation;
- b. The nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and
- c. The soil type and range of soil particle sizes expected to be present on the site.

# 2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.<sup>11</sup>

# 2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.

- a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.<sup>12</sup>
- b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

<sup>&</sup>lt;sup>10</sup> For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for its (their) installation/implementation. See Part 7.2.6.

<sup>&</sup>lt;sup>11</sup> Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2 and 2.3.

<sup>&</sup>lt;sup>12</sup> Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

# 2.1.4 Ensure that all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

- a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.<sup>13</sup>
- b. If at any time you find that a stormwater control needs routine maintenance, you must immediately initiate the needed maintenance work, and complete such work by the close of the next business day.
- c. If at any time you find that a stormwater control needs repair or replacement, you must comply with the corrective action requirements in Part 5.

# 2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

# 2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances.

- a. Compliance Alternatives. For any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:
  - i. Provide and maintain a 50-foot undisturbed natural buffer; or
  - ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
  - iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

See Appendix G, Part G.2 for additional conditions applicable to each compliance alternative.

b. **Exceptions.** See Appendix G, Part G.2 for exceptions to the compliance alternatives.

# 2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infeasible.

# 2.2.3 Install sediment controls along any perimeter areas of the site that will receive pollutant discharges.<sup>14</sup>

- a. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control.
- b. **Exception**. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (e.g., due to a limited or restricted right-of-way),

<sup>&</sup>lt;sup>13</sup> Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

<sup>&</sup>lt;sup>14</sup> Examples of perimeter controls include filter berms, silt fences, vegetative strips, and temporary diversion dikes.

implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

#### 2.2.4 Minimize sediment track-out.

- a. Restrict vehicle use to properly designated exit points;
- b. Use appropriate stabilization techniques 15 at all points that exit onto paved roads.
  - i. **Exception**: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls<sup>16</sup> are implemented to minimize sediment track-out:
- c. Implement additional track-out controls<sup>17</sup> as necessary to ensure that sediment removal occurs prior to vehicle exit; and
- d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance, storm drain inlet, or water of the U.S. 18

# 2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:

- a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated;
- b. Install a sediment barrier along all downgradient perimeter areas;19
- c. For piles that will be unused for 14 or more days, provide cover<sup>20</sup> or appropriate temporary stabilization (consistent with Part 2.2.14);
- d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any stormwater conveyance, storm drain inlet, or water of the U.S.

<sup>&</sup>lt;sup>15</sup> Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

<sup>&</sup>lt;sup>16</sup> Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., karst areas; steep slopes).

<sup>&</sup>lt;sup>17</sup> Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

<sup>&</sup>lt;sup>18</sup> Fine grains that remain visible (i.e., staining) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

<sup>&</sup>lt;sup>19</sup> Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

<sup>&</sup>lt;sup>20</sup> Examples of cover include tarps, blown straw and hydroseeding.

- **2.2.6 Minimize dust.** On areas of exposed soil, minimize the generation of dust through the appropriate application of water or other dust suppression techniques.
- **2.2.7 Minimize steep slope disturbances.** Minimize the disturbance of "steep slopes" (as defined in Appendix A).
- 2.2.8 Preserve native topsoil, unless infeasible.21
- **2.2.9 Minimize soil compaction.**<sup>22</sup> In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:
  - a. Restrict vehicle and equipment use in these locations to avoid soil compaction; and
  - b. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.

# 2.2.10 Protect storm drain inlets.

- a. Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater flow from your site to a water of the U.S., provided you have authority to access the storm drain inlet;<sup>23</sup> and
- b. Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.
- **2.2.11** Minimize erosion of stormwater conveyance channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters. Use erosion controls and velocity dissipation devices<sup>24</sup> within and along the length of any stormwater conveyance channel and at any outlet to slow down runoff to minimize erosion.

# 2.2.12 If you install a sediment basin or similar impoundment:

- a. Situate the basin or impoundment outside of any water of the U.S. and any natural buffers established under Part 2.2.1;
- b. Design the basin or impoundment to avoid collecting water from wetlands;
- c. Design the basin or impoundment to provide storage for either:

<sup>&</sup>lt;sup>21</sup> Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case, it may not be feasible to preserve topsoil.

<sup>&</sup>lt;sup>22</sup> Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

<sup>&</sup>lt;sup>23</sup> Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

<sup>&</sup>lt;sup>24</sup> Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

- ii. The calculated volume of runoff from a 2-year, 24-hour storm (see Appendix H); or
- iii. 3,600 cubic feet per acre drained.
- d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;<sup>25</sup>
- e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and
- f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

# **2.2.13** If using treatment chemicals (e.g., polymers, flocculants, coagulants):

- a. Use conventional erosion and sediment controls before and after the application of treatment chemicals. Chemicals may only be applied where treated stormwater is directed to a sediment control (e.g., sediment basin, perimeter control) before discharge.
- b. **Select appropriate treatment chemicals.** Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated (i.e., the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area).
- c. **Minimize discharge risk from stored chemicals.** Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures (e.g., spill berms, decks, spill containment pallets), or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means (e.g., storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill).
- d. **Comply with state/local requirements.** Comply with applicable state and local requirements regarding the use of treatment chemicals.
- e. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.
- f. **Ensure proper training.** Ensure that all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training. Among other things, the training must cover proper dosing requirements.
- g. Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals. If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as

<sup>&</sup>lt;sup>25</sup> The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

- conditioned by your authorization to ensure that the use of such chemicals will not cause an exceedance of water quality standards.
- **2.2.14** Stabilize exposed portions of the site. Implement and maintain stabilization measures (e.g., seeding protected by erosion controls until vegetation is established, sodding, mulching, erosion control blankets, hydromulch, gravel) that minimize erosion from exposed portions of the site in accordance with Parts 2.2.14a and 2.2.14b.
  - a. Stabilization Deadlines:26

Total Amount of Land Disturbance Occurring At Any One Time <sup>27</sup>	Deadline
<ul> <li>i. Five acres or less (≤5.0)</li> <li>Note: this includes sites disturbing more than five acres (&gt;5.0) total over the course of a project, but</li> </ul>	<ul> <li>Initiate the installation of stabilization measures immediately<sup>28</sup> in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;<sup>29</sup> and</li> </ul>
that limit disturbance at any one time (i.e., phase the disturbance) to five acres or less (≤5.0)	Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days after stabilization has been initiated. <sup>30</sup>

<sup>&</sup>lt;sup>26</sup> EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

- 1. The total area of disturbance for a project is five (5) acres or less.
- 2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to "free up" land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

- 1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
- 2. Applying mulch or other non-vegetative product to the exposed area;
- 3. Seeding or planting the exposed area;
- 4. Starting any of the activities in # 1 3 on a portion of the entire area that will be stabilized; and
- 5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

<sup>&</sup>lt;sup>27</sup> Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

<sup>&</sup>lt;sup>28</sup> The following are examples of activities that would constitute the immediate initiation of stabilization:

<sup>&</sup>lt;sup>29</sup> The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

<sup>&</sup>lt;sup>30</sup> If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

Total Amount of Land Disturbance Occurring At Any One Time <sup>27</sup>	P Deadline	
ii. More than five acres (>5.0)	Initiate the installation of stabilization measures immediately <sup>31</sup> in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days; <sup>32</sup> and	
	<ul> <li>Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.<sup>33</sup></li> </ul>	

# iii. Exceptions:

- (a) Arid, semi-arid, and drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, and vegetative stabilization measures are being used:
  - (i) Immediately initiate and, within 14 calendar days of a temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;
  - (ii) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and
  - (iii) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.
- (b) Operators that are affected by unforeseen circumstances<sup>34</sup> that delay the initiation and/or completion of vegetative stabilization:
  - (i) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;
  - (ii) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and
  - (iii) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.
- (c) Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

32 See footnote 28

33 See footnote 29

<sup>31</sup> See footnote 27

<sup>&</sup>lt;sup>34</sup> Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

- b. Final Stabilization Criteria (for any areas not covered by permanent structures):
  - i. Establish uniform, perennial vegetation (i.e., evenly distributed, without large bare areas) that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas; and/or
  - ii. Implement permanent non-vegetative stabilization measures<sup>35</sup> to provide effective cover.

# iii. Exceptions:

- (a) Arid, semi-arid, and drought-stricken areas (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied that provide cover for at least three years without active maintenance.
- (b) Disturbed areas on agricultural land that are restored to their preconstruction agricultural use. The Part 2.2.14b final stabilization criteria does not apply.
- (c) Areas that need to remain disturbed. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials).

# 2.3 POLLUTION PREVENTION REQUIREMENTS<sup>36</sup>

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

# 2.3.1 For equipment and vehicle fueling and maintenance:

a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities:<sup>37</sup>

<sup>&</sup>lt;sup>35</sup> Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

<sup>&</sup>lt;sup>36</sup> Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

<sup>&</sup>lt;sup>37</sup> Examples of effective means include:

Locating activities away from waters of the U.S. and stormwater inlets or conveyances so that stormwater coming into contact with these activities cannot reach waters of the U.S.;

<sup>•</sup> Providing secondary containment (e.g., spill berms, decks, spill containment pallets) and cover where appropriate; and

<sup>•</sup> Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

- b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;
- c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;
- d. Use drip pans and absorbents under or around leaky vehicles;
- e. Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements; and
- f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

# 2.3.2 For equipment and vehicle washing:

- a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;<sup>38</sup>
- b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and
- c. For storage of soaps, detergents, or solvents, provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

# 2.3.3 For storage, handling, and disposal of building products, materials, and wastes:

- a. For building materials and building products<sup>39</sup>, provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.
- b. For pesticides, herbicides, insecticides, fertilizers, and landscape materials:
  - i. In storage areas, provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and
  - ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).
- c. For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:
  - i. Store chemicals in water-tight containers, and provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these containers to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas (e.g., having a spill kit available on site and ensuring personnel are available to respond expeditiously in

<sup>&</sup>lt;sup>38</sup> Examples of effective means include locating activities away from waters of the U.S. and stormwater inlets or conveyances and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

<sup>&</sup>lt;sup>39</sup> Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

- the event of a leak or spill), or provide secondary containment (e.g., spill berms, decks, spill containment pallets); and
- ii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.
- d. For hazardous or toxic wastes:40
  - i. Separate hazardous or toxic waste from construction and domestic waste;
  - ii. Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;
  - iii. Store all outside containers within appropriately-sized secondary containment (e.g., spill berms, decks, spill containment pallets) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas (e.g., storing chemicals in a covered area, having a spill kit available on site);
  - iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with federal, state, tribal, and local requirements;
  - v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
  - vi. Follow all other federal, state, tribal, and local requirements regarding hazardous or toxic waste.
- e. For construction and domestic wastes:41
  - i. Provide waste containers (e.g., dumpster, trash receptacle) of sufficient size and number to contain construction and domestic wastes;
  - ii. Keep waste container lids closed when not in use and close lids at the end of the business day for those containers that are actively used throughout the day. For waste containers that do not have lids, provide either (1) cover (e.g., a tarp, plastic sheeting, temporary roof) to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants (e.g., secondary containment);
  - iii. On business days, clean up and dispose of waste in designated waste containers; and
  - iv. Clean up immediately if containers overflow.

<sup>&</sup>lt;sup>40</sup> Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

<sup>&</sup>lt;sup>41</sup> Examples of construction and domestic waste include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or building materials.

f. For sanitary waste, position portable toilets so that they are secure and will not be tipped or knocked over, and located away from waters of the U.S. and stormwater inlets or conveyances.

# 2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

- a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so that no overflows can occur due to inadequate sizing or precipitation;
- b. Handle washout or cleanout wastes as follows:
  - i. Do not dump liquid wastes in storm sewers or waters of the U.S.;
  - Dispose of liquid wastes in accordance with applicable requirements in Part 2.3.3; and
  - iii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3; and
- c. Locate any washout or cleanout activities as far away as possible from waters of the U.S. and stormwater inlets or conveyances, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

# 2.3.5 For the application of fertilizers:

- a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6.b.ix;
- b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- d. Never apply to frozen ground;
- e. Never apply to stormwater conveyance channels; and
- f. Follow all other federal, state, tribal, and local requirements regarding fertilizer application.

# 2.3.6 Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. State, tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

# 2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants in ground water or accumulated stormwater that is removed from excavations, trenches, foundations, vaults, or other similar points of accumulation, in accordance with Part 1.2.2.42

- 2.4.1 Treat dewatering discharges with controls to minimize discharges of pollutants;<sup>43</sup>
- **2.4.2** Do not discharge visible floating solids or foam;
- **2.4.3** Use an oil-water separator or suitable filtration device (such as a cartridge filter) that is designed to remove oil, grease, or other products if dewatering water is found to contain these materials:
- 2.4.4 To the extent feasible, use vegetated, upland areas of the site to infiltrate dewatering water before discharge. You are prohibited from using waters of the U.S. as part of the treatment area:
- **2.4.5** At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11;
- **2.4.6** With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and
- **2.4.7** Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications.

# 3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

# 3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional state or tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality

<sup>&</sup>lt;sup>42</sup> Uncontaminated, clear (non-turbid) dewatering water can be discharged without being routed to a control.

<sup>&</sup>lt;sup>43</sup> Appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (e.g., bag or sand filters), and passive treatment systems that are designed to remove sediment. Appropriate controls to use downstream of dewatering controls to minimize erosion include vegetated buffers, check dams, riprap, and grouted riprap at outlets.

standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

#### 3.2 DISCHARGE LIMITATIONS FOR SITES DISCHARGING TO SENSITIVE WATERS 44

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, you must comply with the inspection frequency specified in 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14.a.iii.(c).<sup>45</sup>

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards, including for it to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL, or if coverage under an individual permit is necessary.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

<sup>&</sup>lt;sup>44</sup> Sensitive waters include waters that are impaired and Tier 2, Tier 2.5, and Tier 3 waters.

<sup>&</sup>quot;Impaired waters" are those waters identified by the state, tribe, or EPA as not meeting an applicable water quality standard and (1) requires development of a TMDL (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). Your construction site will be considered to discharge to an impaired water if the first water of the U.S. to which you discharge is an impaired water for the pollutants contained in the discharge from your site. For discharges that enter a storm sewer system prior to discharge, the first water of the U.S. to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available both within the electronic NOI form in NeT, and at https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools.

Tiers 2, 2.5 and 3 refer to waters either identified by the state as high quality waters or Outstanding National Resource Waters under 40 CFR 131.12(a)(2) and (3). For the purposes of this permit, you are considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first water of the U.S. to which you discharge is identified by a state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3. For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the stormwater discharge from the storm sewer system. See list of Tier 2, Tier 2.5, and Tier 3 waters in Appendix F.

EPA may determine on a case-by-case basis that a site discharges to a sensitive water.

<sup>&</sup>lt;sup>45</sup> If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

- a. Implement controls<sup>46</sup> to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and
- b. Ensure that disposal of such materials is performed in compliance with applicable state, federal, and local laws.

#### 4 SITE INSPECTION REQUIREMENTS

# 4.1 PERSON(S) RESPONSIBLE FOR INSPECTING SITE

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that the person who conducts inspections is a "qualified person." <sup>47</sup>

# 4.2 FREQUENCY OF INSPECTIONS. 48

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sensitive waters or qualify for a Part 4.4 reduction in the inspection frequency:

- **4.2.1** At least once every seven (7) calendar days; or
- **4.2.2** Once every 14 calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge.<sup>49</sup> To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

# 4.3 INCREASE IN INSPECTION FREQUENCY FOR SITES DISCHARGING TO SENSITIVE WATERS.

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2), instead of the inspection frequency specified in

<sup>&</sup>lt;sup>46</sup> Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

<sup>&</sup>lt;sup>47</sup> A "qualified person" is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

<sup>&</sup>lt;sup>48</sup> Inspections are only required during the site's normal working hours.

<sup>&</sup>lt;sup>49</sup> "Within 24 hours of the occurrence of a storm event" means that you must conduct an inspection within 24 hours once a storm event has produced 0.25 inches within a 24-hour period, even if the storm event is still continuing. Thus, if you have elected to inspect bi-weekly in accordance with Part 4.2.2 and there is a storm event at your site that continues for multiple days, and each day of the storm produces 0.25 inches or more of rain, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the end of the storm.

Part 4.2, you must conduct inspections in accordance with the following inspection frequencies:

Once every seven (7) calendar days and within 24 hours of the occurrence of a storm event of 0.25 inches or greater, or the occurrence of runoff from snowmelt sufficient to cause a discharge. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

#### 4.4 REDUCTIONS IN INSPECTION FREQUENCY

# 4.4.1 Stabilized areas.

- a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month in any area of your site where the stabilization steps in 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.
- b. **Exception.** For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event of 0.25 inches or greater. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a Inspections must continue until final stabilization is visually confirmed following a storm event of 0.25 inches or greater.
- 4.4.2 Arid, semi-arid, or drought-stricken areas (as defined in Appendix A). If it is the seasonally dry period or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event of 0.25 inches or greater. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. To determine if a storm event of 0.25 inches or greater has occurred on your site, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any day of rainfall during normal business hours that measures 0.25 inches or greater, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

# 4.4.3 Frozen conditions:

a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

- i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;
- ii. Land disturbances have been suspended; and
- iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.
- b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:
  - i. Runoff is unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and
  - ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

#### 4.5 AREAS THAT MUST BE INSPECTED

During your site inspection, you must at a minimum inspect the following areas of your site:

- **4.5.1** All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;
- **4.5.2** All stormwater controls (including pollution prevention controls) installed at the site to comply with this permit;<sup>50</sup>
- **4.5.3** Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;
- **4.5.4** All areas where stormwater typically flows within the site, including drainageways designed to divert, convey, and/or treat stormwater;
- **4.5.5** All points of discharge from the site; and
- **4.5.6** All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

#### 4.6 REQUIREMENTS FOR INSPECTIONS

During your site inspection, you must at a minimum:

**4.6.1** Check whether all stormwater controls (i.e., erosion and sediment controls and pollution prevention controls) are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges;

<sup>&</sup>lt;sup>50</sup> This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

- **4.6.2** Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
- **4.6.3** Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3;
- **4.6.4** Check for signs of visible erosion and sedimentation (i.e., sediment deposits) that have occurred and are attributable to your discharge at points of discharge and, if applicable, the banks of any waters of the U.S. flowing within or immediately adjacent to the site;
- **4.6.5** Identify any incidents of noncompliance observed;
- **4.6.6** If a discharge is occurring during your inspection:
  - a. Identify all discharge points at the site; and
  - b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.
- **4.6.7** Based on the results of your inspection, complete any necessary maintenance under Part 2.1.4 and corrective action under Part 5.

#### 4.7 INSPECTION REPORT

- **4.7.1** You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report must include the following:
  - a. The inspection date;
  - b. Names and titles of personnel making the inspection;
  - c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any necessary maintenance or corrective actions;
  - d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of rainfall measuring 0.25 inches or greater, you must include the applicable rain gauge or weather station readings that triggered the inspection; and
  - e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.
- **4.7.2** Each inspection report must be signed in accordance with Appendix I, Part I.11 of this permit.
- **4.7.3** You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- **4.7.4** You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

# 4.8 INSPECTIONS BY EPA

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls that are not on site to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

- **4.8.1** Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;
- **4.8.2** Access and copy any records that must be kept under the conditions of this permit;
- 4.8.3 Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and
- **4.8.4** Sample or monitor for the purpose of ensuring compliance.

#### 5 CORRECTIVE ACTIONS

# 5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.

You must take corrective action to address any of the following conditions identified at your site:

- **5.1.1** A stormwater control needs repair or replacement (beyond routine maintenance required under Part 2.1.4); or
- **5.1.2** A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
- **5.1.3** Your discharges are causing an exceedance of applicable water quality standards; or
- **5.1.4** A prohibited discharge has occurred (see Part 1.3).

# 5.2 CORRECTIVE ACTION DEADLINES

For any corrective action triggering conditions in Part 5.1, you must:

- **5.2.1** Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events;
- **5.2.2** When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day;
- 5.2.3 When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP,

you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

# 5.3 CORRECTIVE ACTION REQUIRED BY EPA

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

#### 5.4 CORRECTIVE ACTION REPORT

For each corrective action taken in accordance with this Part, you must complete a report in accordance with the following:

- **5.4.1** Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.
- **5.4.2** Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.
- **5.4.3** Each corrective action report must be signed in accordance with Appendix I, Part I.11 of this permit.
- **5.4.4** You must keep a copy of all corrective action reports at the site or at an easily accessible location, so that it can be made available at the time of an on-site inspection or upon request by EPA.
- 5.4.5 You must retain all corrective action reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

# **6 STAFF TRAINING REQUIREMENTS**

Each operator, or group of multiple operators, must assemble a "stormwater team" to carry out compliance activities associated with the requirements in this permit.

- Prior to the commencement of construction activities, you must ensure that the following personnel<sup>51</sup> on the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements:
  - a. Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);
  - b. Personnel responsible for the application and storage of treatment chemicals (if applicable);
  - c. Personnel who are responsible for conducting inspections as required in Part 4.1; and
  - d. Personnel who are responsible for taking corrective actions as required in Part 5.

<sup>&</sup>lt;sup>51</sup> If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit.

For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

- You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers, but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.
- 6.3 At a minimum, members of the stormwater team must be trained to understand the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):
  - a. The permit deadlines associated with installation, maintenance, and removal of stormwater controls and with stabilization;
  - b. The location of all stormwater controls on the site required by this permit and how they are to be maintained;
  - c. The proper procedures to follow with respect to the permit's pollution prevention requirements; and
  - d. When and how to conduct inspections, record applicable findings, and take corrective actions.
- 6.4 Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

# 7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

#### 7.1 GENERAL REQUIREMENTS

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.<sup>52, 53</sup> The SWPPP must be kept up-to-date throughout coverage under this permit.

Where there are multiple operators associated with the same site through a common plan of development or sale, operators may assign to themselves various permit-related functions under the SWPPP provided that each SWPPP, or a group SWPPP, documents which operator will perform each function under the SWPPP. However, dividing the functions to be performed under each SWPPP, or a single group SWPPP, does not relieve an individual operator from liability for complying with the permit should another operator fail to implement any measures that are necessary for that individual operator to comply with the permit, e.g., the installation and maintenance of any shared controls. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not cause a violation and/or render any other operators' controls and/or any shared controls ineffective. All operators who rely on a shared control to comply with the permit are jointly and severally liable for violations of the permit resulting from the failure to properly install, operate and/or maintain the shared control.

<sup>&</sup>lt;sup>52</sup> The SWPPP does not establish the effluent limits that apply to your site's discharges; these limits are established in this permit in Parts 2 and 3.

<sup>&</sup>lt;sup>53</sup> You have the option of developing a group SWPPP where you are one of several operators at your site. For instance, if both the owner and the general contractor of the construction site are operators and thus are both required to obtain a permit, the owner may be the party undertaking SWPPP development, and the general contractor (or any other operator at the site) can choose to use this same SWPPP, as long as the SWPPP addresses the general contractor's (or other operator's) scope of construction work and functions to be performed under the SWPPP. Regardless of whether there is a group SWPPP or several individual SWPPPs, all operators would be jointly and severally liable for compliance with the permit.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

#### 7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

- **7.2.1 All Site Operators.** Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.
- **7.2.2 Stormwater Team.** Identify the personnel (by name or position) that are part of the stormwater team, as well as their individual responsibilities, including which members are responsible for conducting inspections.

# **7.2.3** Nature of Construction Activities.<sup>54</sup> Include the following:

- a. A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;
- b. The size of the property (in acres or length in miles if a linear construction site);
- c. The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);
- d. A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c);
- e. The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;
- f. A description and projected schedule for the following:
  - i. Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - ii. Temporary or permanent cessation of construction activities in each portion of the site;
  - iii. Temporary or final stabilization of exposed areas for each portion of the site; and
  - iv. Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.
- g. A list and description of all pollutant-generating activities<sup>55</sup> on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (e.g., sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels) associated with that activity, which could be discharged in stormwater from your construction site. You must take

<sup>&</sup>lt;sup>54</sup> If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

<sup>&</sup>lt;sup>55</sup> Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering operations.

- into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;
- h. Business days and hours for the project;
- i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), information substantiating its occurrence (e.g., state disaster declaration or similar state or local declaration), and a description of the construction necessary to reestablish affected public services.
- **7.2.4 Site Map.** Include a legible map, or series of maps, showing the following features of the site:
  - a. Boundaries of the property;
  - b. Locations where construction activities will occur, including:
    - i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;
    - ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));
    - iii. Locations where sediment, soil, or other construction materials will be stockpiled;
    - iv. Any water of the U.S. crossings;
    - v. Designated points where vehicles will exit onto paved roads;
    - vi. Locations of structures and other impervious surfaces upon completion of construction; and
    - vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).
  - c. Locations of all waters of the U.S. within and one mile downstream of the site's discharge point. Also identify if any are listed as impaired, or are identified as a Tier 2, Tier 2.5, or Tier 3 water;
  - d. Areas of federally listed critical habitat within the site and/or at discharge locations;
  - e. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures);
  - f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;
  - g. Stormwater and authorized non-stormwater discharge locations, including:
    - i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets;<sup>56</sup> and
    - ii. Locations where stormwater or authorized non-stormwater will be discharged directly to waters of the U.S.
  - h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;

<sup>&</sup>lt;sup>56</sup> The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

- i. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and
- j. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.
- **7.2.5 Non-Stormwater Discharges.** Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

# 7.2.6 Description of Stormwater Controls.

- a. For each of the Part 2.2 erosion and sediment control effluent limits, Part 2.3 pollution prevention effluent limits, and Part 2.4 construction dewatering effluent limits, as applicable to your site, you must include the following:
  - i. A description of the specific control(s) to be implemented to meet the effluent limit:
  - ii. Any applicable stormwater control design specifications (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);<sup>57</sup>
  - iii. Routine stormwater control maintenance specifications; and
  - iv. The projected schedule for stormwater control installation/implementation.
- b. You must also include any of the following additional information as applicable.
  - i. Natural buffers and/or equivalent sediment controls (see Part 2.2.1 and Appendix G). You must include the following:
    - (a) The compliance alternative to be implemented;
    - (b) If complying with alternative 2, the width of natural buffer retained;
    - (c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;
    - (d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;
    - (e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and
    - (f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a water of the U.S.
  - ii. **Perimeter controls for a "linear construction site"** (see Part 2.2.3). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3a requirement that sediment be removed

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<sup>&</sup>lt;sup>57</sup> Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

- before it has accumulated to one-half of the above-ground height of any perimeter control.
- iii. **Sediment track-out controls** (see Parts 2.2.4b and 2.2.4c). Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.
- iv. **Sediment basins** (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.
- v. **Treatment chemicals** (see Part 2.2.13), you must include the following:
  - (a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction:
  - (b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;
  - (c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to an exceedance of water quality standards;
  - (d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;
  - (e) Information from any applicable Safety Data Sheet (SDS);
  - (f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;
  - (g) A description of how chemicals will be stored consistent with Part 2.2.13c;
  - (h) References to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and
  - (i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.
- vi. Stabilization measures (see Part 2.2.14). You must include the following:
  - (a) The specific vegetative and/or non-vegetative practices that will be used;
  - (b) The stabilization deadline that will be met in accordance with Part 2.2.14.a.i-ii;
  - (c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period and the schedule you will follow for initiating and completing vegetative stabilization; and
  - (d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.

- vii. **Spill prevention and response procedures** (see Part 1.3.5 and Part 2.3). You must include the following:
  - (a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and
  - (b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302, occurs during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.
    - You may also reference the existence of Spill Prevention Control and Countermeasure (SPCC) plans developed for the construction activity under Part 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.<sup>58</sup>
- viii. **Waste management procedures** (see Part 2.3.3). Describe the procedures you will follow for handling, storing and disposing of all wastes generated at your site consistent with all applicable federal, state, tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste.
- ix. **Application of fertilizers** (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.
- **7.2.7** Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit. Also include:
  - a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;
  - b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;
  - c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;
  - d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and
  - e. Any maintenance or inspection checklists or other forms that will be used.

<sup>&</sup>lt;sup>58</sup> Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

- **7.2.8 Staff Training.** Include documentation that the required personnel were, or will be, trained in accordance with Part 6.
- 7.2.9 Compliance with Other Requirements.
  - a. **Threatened and Endangered Species Protection.** Include documentation required in Appendix D supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.
  - b. **Historic Properties.** Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.
  - c. Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls. If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable state agency<sup>59</sup> or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR 144-147. Such controls would generally be considered Class V UIC wells:
    - Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);
    - ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and
    - iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).
- **7.2.10 SWPPP Certification.** You must sign and date your SWPPP in accordance with Appendix I, Part I.11.
- **7.2.11 Post-Authorization Additions to the SWPPP.** Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:
  - a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;
  - b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (i.e., permit tracking number);
  - c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

## 7.3 ON-SITE AVAILABILITY OF YOUR SWPPP

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a state, tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

<sup>&</sup>lt;sup>59</sup> For state UIC program contacts, refer to the following EPA website: <a href="https://www.epa.gov/uic">https://www.epa.gov/uic</a>.

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.<sup>60</sup>

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

## 7.4 SWPPP MODIFICATIONS

- **7.4.1** You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:
  - a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;
  - b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;
  - d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:
    - i. A copy of any correspondence describing such measures and requirements; and
    - ii. A description of the controls that will be used to meet such requirements.
  - e. To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls implemented at the site; and
  - f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.
- **7.4.2** You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.10 above) and a brief summary of all changes.
- **7.4.3** All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix I, Part I.11.b.
- **7.4.4** Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

<sup>&</sup>lt;sup>60</sup> Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR Part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

## 8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

## 8.1 MINIMUM INFORMATION REQUIRED IN NOT

- **8.1.1** NPDES ID (i.e., permit tracking number) provided by EPA when you received coverage under this permit;
- **8.1.2** Basis for submission of the NOT (see Part 8.2);
- **8.1.3** Operator contact information;
- **8.1.4** Name of site and address (or a description of location if no street address is available); and
- 8.1.5 NOT certification.

## 8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You must terminate CGP coverage only if one or more of the following conditions has occurred:

- **8.2.1** You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met the following requirements:
  - a. For any areas that (1) were disturbed during construction, (2) are not covered over by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14b;
  - b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;
  - c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable; and
  - d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or
- **8.2.2** You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or
- **8.2.3** Coverage under an individual or alternative general NPDES permit has been obtained.

## 8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOT for the 2017 CGP.

To access NeT, go to <a href="https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting">https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting</a>.

Waivers from electronic reporting may be granted as specified in Part 1.4.1. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix K.

## 8.4 DEADLINE FOR SUBMITTING THE NOT

You must submit your NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

## 8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

## 9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES

The provisions in this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and areas in certain states subject to construction projects by Federal Operators. States, Indian country, and areas subject to construction by Federal Operators not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

#### 9.1 EPA REGION 1

## 9.1.1 NHR100000 State of New Hampshire

- a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for an Alteration of Terrain (AoT) permit from DES pursuant to RSA 485- A:17 and Env-Wq 1500. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule.
- b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site <a href="http://des.nh.gov/">http://des.nh.gov/</a> by using the One Stop Data Mapper at <a href="http://des.nh.gov/onestop/gis.htm">http://des.nh.gov/onestop/gis.htm</a>. If it is determined that the groundwater to be dewatered is near a remediation or other waste site you must

- apply for the Remediation General Permit (see <a href="https://www3.epa.gov/region1/npdes/rgp.html">https://www3.epa.gov/region1/npdes/rgp.html</a>.)
- c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at least once per week during weeks when discharges occur. Samples must be analyzed for total suspended solids (TSS) or turbidity and must meet monthly average and daily maximum limits of 50 milligrams per liter (mg/L) and 100 mg/L, respectively for TSS or 33 mg/l and 67 mg/l, respectively for turbidity. TSS (a.k.a. Residue, Nonfilterable) or turbidity sampling and analysis must be performed in accordance with Tables IB and II in 40 CFR 136.3 (http://www.ecfr.gov/cgi-bin/text-idx?SID=0243e3c4283cbd7d8257eb6afc7ce9a2&mc=true&node=se40.25.136\_13&rgn=div8). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.
- d. Construction site owners and operators must consider opportunities for post-construction groundwater recharge using infiltration best management practices (BMPs) during site design and preparation of the SWPPP. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GAI or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04(e), including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.26). For design considerations for infiltration measures see Volume II of the NH Stormwater Manual.
- e. Appendix F contains a list of Tier 2, or high quality waters. Although there is no official list of tier 2 waters, it can be assumed that all NH surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see Surface Water Quality Watershed Report Cards at <a href="http://des.nh.gov/organization/divisions/water/wmb/swqa/report\_cards.htm">http://des.nh.gov/organization/divisions/water/wmb/swqa/report\_cards.htm</a>) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU. A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.
- f. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown in Part 9.1.4 (g).
  - i. A site map required in Part 7.2.4, showing the type and location of all post-construction infiltration BMPs utilized at the facility or the reason(s) why none were installed;
  - ii. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2).

- iii. Records of sampling and analysis of TSS required for construction dewatering discharges (see Part 9.1.4 (c)).
- g. All required or requested documents must be sent to:

NH Department of Environmental Services, Wastewater Engineering Bureau, Permits & Compliance Section P.O. Box 95 Concord, NH 03302-0095

#### 9.2 EPA REGION 3

## 9.2.1 DCR100000 District of Columbia

- a. The permittee must comply with the District of Columbia Water Pollution Control Act of 1984, as amended, (D.C. Official Code §8-103.01 et seq.) and its implementing regulations in Title 21, Chapters 11 and 19 of the District of Columbia Municipal Regulations. Nothing in this permit will be construed to preclude the institution of any legal action or relieve the permitee from any responsibilities, liabilities, or penalties established pursuant to District of Columbia laws and regulations.
- b. The permittee must comply with the District of Columbia Stormwater Management, and Soil Erosion and Sediment Control in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.
- c. The permittee must comply with the District of Columbia Flood Management control in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.
- d. The Department may request a copy of the Stormwater Pollution Prevention Plan (SWPPP) and the permittee is required to submit the SWPPP to the Department with 14 days of such request. The Department may conduct an inspection of any facility covered by this permit to ensure compliance with District's law requirements including water quality.

# 9.2.2 DER10F000 Areas in the State of Delaware subject to construction by a Federal Operator

- a. Federal agencies engaging in construction activities must submit, to DNREC, a sediment and stormwater management (\$&\$) plan and obtain approval from DNREC in accordance with 7 Del. C. §4010, 7 DE Admin. Code 5101, and 7 DE Admin. Code 7201.
- b. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.
- c. Federal agencies engaging in construction activities must certify that all responsible personnel involved in the construction project will have attended the blue card training prior to initiation of any land disturbing activity see 7 Del. C. §§ 4002 & 4014 and 7 DE Admin. Code 5101.

## 9.3 EPA REGION 5

## 9.3.1 MNR101000 Indian country within the State of Minnesota

**9.3.1.1 Fond du Lac Band of Lake Superior Chippewa.** The following conditions apply only to discharges on the Fond du Lac Band of Lake Superior Chippewa Reservation:

a. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent (NOI) to EPA. The SWPPP can be submitted electronically to richardgitar@FDLREZ.com or by hardcopy sent to:

> Fond du Lac Reservation Office of Water Protection 1720 Big Lake Road Cloquet, MN 55720

CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving.

- b. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.
- c. The turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff.
- d. Turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling.
- e. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters in which no ambient turbidity data exists.
- f. This Certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in § 105 b.3. of the Fond du Lac Water Quality Standards (Ordinance #12/98, as amended). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit from EPA for stormwater discharges from large and small construction activities.
- g. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, and commercial.
- Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management

- agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size.
- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.
- **9.3.1.2 Grand Portage Band of Lake Superior Chippewa.** The following conditions apply only to discharges on the Grand Portage Band of Lake Superior Chippewa Reservation:
  - a. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification"). This Certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing as such.
  - b. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance). As such, appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation (as defined in the Water Resources Ordinance). All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.
  - c. The 2017 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2017 CGP. The monitoring plan must be prepared and incorporated into the Stormwater Pollution Prevention Plan (the "SWPPP"). A copy of the SWPPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPPP should be sent to:

Grand Portage Environmental Resources Board P.O. Box 428 Grand Portage, MN 55605

Copies of the Notice of Intent and Notice of Termination required under the CGP must be submitted to the Board at the address above at the same time they are submitted to the EPA.

- d. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards.
- e. Discharges that the Board has determined to be or that may reasonably be expected to be contributing to a violation of Water Quality Standards or Applicable Federal Standards are not authorized by this Certification.

- f. The Board retains full authority provided by the Water Resources Ordinance to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions.
- g. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

# 9.3.2 WIR101000 Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community

- **9.3.2.1 Bad River Band of Lake Superior Tribe of Chippewa Indians:** The following conditions apply only to discharges on the Bad River Band of the Lake Superior Tribe of Chippewa Indians Reservation:
  - a. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, or historical sites, or properties that may be eligible for listing as such. 61, 62
  - b. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (or Tier 3 water). 63 Outstanding Tribal Resource Waters, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River. 64
  - c. Projects utilizing cationic treatment chemicals<sup>65</sup> within the Bad River Reservation boundaries are not eligible for coverage under the CGP.<sup>66</sup>
  - d. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS).<sup>67</sup>
  - e. An operator proposing to discharge to an Outstanding Resource Water (or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Outstanding Resource Waters, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweiler River, Tyler Forks, Bell Creek, and Vaughn Creek.<sup>68</sup> The antidegradation

<sup>&</sup>lt;sup>61</sup> Bad River Band of Lake Superior Tribe of Chippewa Indians Water Quality Standards adopted by Resolution No. 7-6-11-441 (hereafter, Tribe's WQS).

<sup>62 36</sup> C.F.R. § 800.16(I)(2).

<sup>&</sup>lt;sup>63</sup> Tribe's WQS: See provisions E.3.ii. and E.4.iv.

<sup>64</sup> Tribe's WQS: See provision E.2.iii.

<sup>&</sup>lt;sup>65</sup> See definition of cationic treatment chemicals in Appendix A of the CGP.

<sup>66</sup> Tribe's WQS: See provisions E.6.ii.a. and E.6.ii.c.

<sup>&</sup>lt;sup>67</sup> See footnote 61.

<sup>&</sup>lt;sup>68</sup> Tribe's WQS: See provision E.2.ii.

demonstration materials described in provision E.4.iii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department Attn: Water Resources Specialist P.O. Box 39 Odanah, WI 54861

f. An operator proposing to discharge to an Exceptional Resource Water (or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. Exceptional Resource Waters, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water).<sup>69</sup> The antidegradation demonstration materials described in provision E.4.ii. must be submitted to the following address:

Bad River Tribe's Natural Resources Department Attn: Water Resources Specialist P.O. Box 39 Odanah, WI 54861

- g. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.<sup>70</sup>
- h. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or wetlands@badriver-nsn.gov.
- i. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities.<sup>71, 72</sup> The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

Bad River Tribe's Natural Resources Department Attn: Water Resources Specialist P.O. Box 39 Odanah, WI 54861

<sup>&</sup>lt;sup>69</sup> Tribe's WQS: See provision E.2.i.

<sup>&</sup>lt;sup>70</sup> Tribe's WQS: See provision E.7.iii.

<sup>&</sup>lt;sup>71</sup> See footnote 61.

<sup>&</sup>lt;sup>72</sup> See footnote 62.

Bad River Tribe's Natural Resources Department Attn: Tribal Historic Preservation Officer (THPO) P.O. Box 39 Odanah, WI 54861

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA.

- j. The THPO must be provided 30 days to comment on the project.73
- k. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.<sup>74</sup>
- I. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI: 75

Bad River Tribe's Natural Resources Department Attn: Water Resources Specialist P.O. Box 39 Odanah, WI 54861

m. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion: <sup>76</sup>

Bad River Tribe's Natural Resources Department P.O. Box 39 Odanah, WI 54861

- n. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.<sup>77</sup>
- 9.3.2.2 Lac du Flambeau Band of Lake Superior Tribe of Chippewa Indians: The following conditions apply only to discharges on the Lac du Flambeau Band of the Lake Superior Tribe of Chippewa Indians Reservation:
  - a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office, for the Traival environmental review process, at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Lac du Flambeau Tribal Land Management

<sup>&</sup>lt;sup>73</sup> 36 C.F.R. § 800.3(c)(4).

<sup>74 36</sup> C.F.R. § 800.3(b).

<sup>&</sup>lt;sup>75</sup> See footnote 61.

<sup>&</sup>lt;sup>76</sup> See footnote 61.

<sup>&</sup>lt;sup>77</sup> See footnote 61.

P.O. Box 279 Lac du Flambeau, WI 54538

CGP applicants are encouraged to work with the LdF Water Resources Program in the identification of all proposed receiving waters.

- b. Copies of the NOI and the Notice of Termination (NOT) must be sent to the LdF Water Resources Program at the same time they are submitted to EPA.
- c. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Lac du Flambeau Reservation. This includes, but is not limited to, the prevention of any discharge that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Lac du Flambeau Reservation for any of the uses designated in the Water Quality Standards of the Lac du Flambeau Reservation.
- d. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Lac du Flambeau Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Lac du Flambeau reservation, including groundwater.
- e. This certification does not authorize impacts to cultural, historical, or archeological features or sties, or properties that may be eligible for such listing.
- f. Due to the significant ecological and cultural importance of the Lac du Flambeau Reservation, any operator requesting a permit for a point source discharge of pollutants (i.e., discharge) associated with the Stormwater Discharge will need a stormwater pollution prevention plan in place that does not violate Lac du Flambeau Water Quality Standards to protect Reservation Waters.

## 9.4 EPA REGION 6

## 9.4.1 NMR100000 State of New Mexico, except Indian country

- a. If construction dewatering activities are anticipated at a site, permittees must complete the following steps:
  - i. Investigative information must be documented in the facility SWPPP.
  - ii. Refer to the GWQB Mapper at <a href="https://gis.web.env.nm.gov/GWQB/">https://gis.web.env.nm.gov/GWQB/</a> AND the PSTB Mapper (Go Mapper) at <a href="https://gis.web.env.nm.gov/GoNM/">https://gis.web.env.nm.gov/GoNM/</a> and check if the following sources are located within the noted distance from your anticipated construct site groundwater dewatering activity:

Project Location Relative to a Source of Potential	II = 1
Groundwater Contamination	required for testing
Within 0.5 mile of an open Leaking Underground	BTEX (Benzene, Toluene,
Storage Tank (LUST) site	Ethylbenzene, and Xylene)
	plus additional parameters
	depending on site conditions.*

Project Location Relative to a Source of Potential Groundwater Contamination	Constituents likely to be required for testing
Within 0.5 mile of an open Voluntary Remediation site	All parameters listed in Appendix A (or an alternate
Within 0.5 mile of an open RCRA Corrective Action Site	list approved by the NMED SWQB)**
Within 0.5 mile of an open Abatement Site	
Within 0.5 mile of an open Brownfield Site	
Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.	

<sup>\*</sup>For further assistance determining whether dewatering may encounter impacted groundwater, the permittee may contact the NMED Ground Water Quality Bureau at: 505-827-2965.

iii. If dewatering activities are anticipated, information on flow and potential to encounter impacted groundwater must be provided directly to NMED at the following address:

Program Manager, Point Source Regulation Section NMED Surface Water Quality Bureau PO Box 5469, Santa Fe, NM 87502

Information may also be emailed - the contact information for the program manager is located on the website at: <a href="https://www.env.nm.gov/swqb/PSR">www.env.nm.gov/swqb/PSR</a>.

- iv. Permittee must test the quality of the water being considered for discharge. Permittees must contact the Point Source Regulation Section Program Manager for information on constituents that must be monitored.
- v. Permittee must send test result data to EPA Region 6 and the NMED Surface Water Quality Bureau. If the test data exceed standards, it cannot be discharged from the construction site into surface waters under this permit. Discharge to surface waters must be conducted under a separate NPDES individual permit to ensure proper treatment and disposal.
- vi. If disposal will be to the ground surface or in an unlined pond, the permittee must submit an NOI/ to the NMED Ground Water Quality Bureau.
- Operators are not eligible to obtain authorization under this permit for all new and existing storm water discharges to outstanding national resource waters (ONRWs) (also referred to as "Tier 3" waters.)
  - i. Although state WQS provide for temporary and short-term degradation of water quality in an ONRW under very limited circumstances if approved by the Water Quality Control Commission as specified at 20.6.4.8.A NMAC, the approval process required for these activities does not lend itself for use for projects covered under this general permit. This condition is necessary to ensure that no degradation is allowed in ONRWs by requiring proposed storm water discharges to be reviewed under the individual permit process. Tier 3 waters are defined in Appendix F of the proposed permit.

<sup>\*\*</sup>EPA approved-sufficiently sensitive methods must be used - approved methods are listed in 40 CFR Part 136.3.

- c. Operators who intend to obtain authorization under this permit for new and existing storm water discharges from construction sites must satisfy the following condition: The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from preconstruction, pre-development conditions to assure that applicable standards in 20.6.4.NMAC, including the antidegradation policy, or TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs. For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriate soil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generally accepted (by professional erosion control specialists) soil loss prediction tools.
  - i. For all sites, the operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, predevelopment conditions.
  - ii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g. CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP. The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.
- d. State regulations at 20.6.2.1203 NMAC state: With respect to any discharge from any facility of oil or other water contaminant, in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property, or unreasonably interfere with the public welfare or the use of property, the following notifications and corrective actions are required:
  - i. As soon as possible after learning of such a discharge, but in no event more than twenty-four (24) hours thereafter, any person in charge of the facility shall orally notify the Chief of the Ground Water Quality Bureau of the department, or his counterpart in any constituent agency delegated responsibility for enforcement of these rules as ta any facility subject to such delegation.
  - Permittees can call 505-827-9329 for emergencies at any time and 505-476-6000 for non-emergencies during business hours from 5am-5pm, Monday through Friday.
- e. NMED does not allow permittees to use the Equivalent Analysis Waiver.
- 9.4.2 NMR101000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR100001 and Ute Mountain Reservation Lands that are covered under Colorado permit COR100001.

- **9.4.2.1 Pueblo of Isleta.** The following conditions apply only to discharges on the Pueblo of Isleta Reservation:
  - a. CGP at 1.3 Prohibited discharges: Stormwater discharges associated with construction activity that EPA or the Pueblo of Isleta, prior to authorization under this perm it, determines will cause, have the reasonable potential to cause, or may reasonably be expected to contribute to a violation or excursion of any applicable water quality standard, including the antidegradation policy, or the impairment of a designated use of receiving waters are not authorized by this permit.
  - b. CGP at 1.4.1 How to Submit Your NOI: The operator shall provide a copy of the Notice of Intent ("NOI") to the Pueblo of Isleta at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of the Pueblo of Isleta. The operator shall also notify the Pueblo of Isleta when it has submitted the Notice of Termination ("NOT"). The NOI and NOT shall be sent to the Pueblo of Isleta at the following address:

Water Quality Control Officer Pueblo of Isleta Environment Division PO Box 1270 Isleta, NM 87022 (505) 869-7565

E-mail: POI36871@isletapueblo.com

Overnight/Express Mail Delivery Pueblo of Isleta Environment Division 6 Sagebrush St. Albuquerque, NM 87105

- c. CGP at 1.5 Requirement to post a notice of your permit coverage: Amend to read: "You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site..."
- d. CGP at 7.2.6 Description of stormwater controls: The SWPPP will be considered to be incomplete if the operator has not coordinated requirements under this Part with the Pueblo of Isleta Public Services Department.
- e. CGP I.12.6.1 at pg.I-6 of 8. The Pueblo of Isleta requests notification within 10 hours (rather than 24 hrs.) if health or the environment become endangered.
- f. CGP at 1.12.2 Anticipated noncompliance: Amend to read: "You must give advance notice to EPA and the Pueblo of Isleta at the address indicated in 1.4.1(a) of any planned changes in the permitted facility or activity which may results in noncompliance with permit requirements."
- g. CGP at I.12.6.1: Any noncompliance for projects within the exterior boundaries of the Pueblo of Isleta which may endanger health or the environment shall be reported directly to the EPA Regional Office [(see contacts at <a href="https://www.epa.gov/npdes/contact-us-stormwater#regional">https://www.epa.gov/npdes/contact-us-stormwater#regional</a>) I and to the Pueblo of Isleta Water Quality Control Officer. Any information must be provided orally with n 12 hours of the time you become aware of the circumstances. Other requirements of

this Part for a written submission apply. Electronic communication (E-mail) shall be provided as soon as practical. Verbal notice shall be provided to:

Water Quality Control Officer

Pueblo of Isleta

E-mail: POI36871@isletapueblo.com

(505) 869-7565

(505) 263-5425 cellular

(505) 869-3030 Police Dispatch

- h. CGP at 2.2 Erosion and sediment control requirements: Erosion and sediment controls shall be designed to retain sediment on-site.
- i. CGP at 2.2 Under Sediment control requirements, Standard Permit Condition Duty to Mitigate Volumes of sediment at or over (five) 5 cubic yards must be removed and placed for disposal within a tribally approved sediment Disposal Site, located on Pueblo of Isleta lands. CGP 2.2 at pg. 8.
- j. Under Minimize erosion, a permittee must secure permission from the Pueblo or affected Pueblo of Isleta land assignment owner if a dissipation device needs to be placed up- or down- elevation of a given construction site. CGP 2.2.11 at pg. 11.
- k. CGP at 2.3.6 Emergency spill notification requirements: You must notify the Pueblo of Isleta Water Quality Control Officer and National Response Center (NRC) [at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302] as soon as you have knowledge of the release. Verbal and electronic notice shall be provided as specified in I.12.6.1
- I. CGP at C.3 Equivalent analysis waiver: Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta Water Quality Control Officer at the address indicated in 1.4.1 (a).
- **9.4.2.2 Pueblo of Sandia.** The following conditions apply only to discharges on the Pueblo of Sandia Reservation:
  - a. Only those activities specifically authorized by the CGP are authorized by the Pueblo of Sandia's Water Quality certification. The Pueblo of Sandia's Water Quality Certification does not authorize impact to cultural properties, historical sites or properties that may be eligible as such.
  - b. Copies of all Notices of Intent (NOI) submitted to the EPA must also be sent concurrently to the Pueblo of Sandia at the following address. Discharges are not authorized by this permit unless an accurate and complete NOI has been submitted to the Pueblo of Sandia, either by mail or electronically.

Regular U.S. Delivery Mail:

Pueblo of Sandia Environment Department Attention: Scott Bulgrin, Water Quality Manager 481 Sandia Loop

Bernalillo, New Mexico 87004

**Electronically:** 

sbulgrin@sandiapueblo.nsn.us

- c. Any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, enforcement, monitoring, or an adverse incident written reports should likewise be routed to the Pueblo of Sandia at the above address.
- d. The Stormwater Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia Environment Department either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Pueblo staff time to become familiar with the project site, prepare for construction site inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in the delay or denial of the construction project.
- e. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards not authorized by this certification.
- f. An "Authorization to Proceed Letter" with site specific mitigation requirements may be sent out to the permittee when a review of the NOI and SWPPP, on a case-by-case basis is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.
- g. The Pueblo of Sandia will not allow Small construction Waivers (Appendix C) or the Rainfall Erosivity Waiver (Appendix C.1) to be granted for any small construction activities.
- h. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to EPA.
- i. Copies of all NOT submitted to the EPA must also be sent concurrently to the Pueblo of Sandia through the mail or electronically.

## Regular U.S. Delivery Mail:

Pueblo of Sandia Environment Department

Attention: Scott Bulgrin, Water Quality Manager 481 Sandia Loop

Bernalillo, New Mexico 87004

## **Electronically**:

sbulgrin@sandiapueblo.nsn.us

- j. The Pueblo of Sandia may require the permittee to perform water quality monitoring for pH, turbidity, and total suspended solids (TSS) during the permit term if the discharge is to a surface water leading to the Rio Grande for the protection of public health and the environment.
- **9.4.2.3 Pueblo of Santa Ana.** The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:
  - a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Santa Ana (the Pueblo), at the same time it is submitted to the U.S. Environmental Protection Agency (EPA), for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.

- b. The operator shall provide a copy of the Stormwater Pollution Prevention Plan (SWPPP), at the same time that an NOI is submitted to the EPA, to the Pueblo for projects with discharges onto the lands of the Pueblo as defined in the Pueblo of Santa Ana Water Quality Standards.
- c. The operator shall provide a copy of the SWPPP, copies of inspections reports, and copies of corrective action reports to the Pueblo at the address below for review, upon request.
- d. The NOI, SWPPP and Notice of Termination (NOT) shall be sent to the Pueblo at the following address:

Pueblo of Santa Ana Department of Natural Resources,

Attention: Water Quality Program Specialist

2 Dove Road

Santa Ana Pueblo, NM, 87004

- e. Discharges are not authorized by this permit unless an accurate and complete NOI and SWPPP have been submitted to the Pueblo. Failure to provide an accurate and complete NOI and SWPPP may result in a denial of the discharge permit or groundbreaking or construction delay.
- f. The operator will not proceed with site work until authorized by the Pueblo. The Pueblo requires review of the complete and final SWPPP by the Pueblo before authorization to proceed. The Pueblo will provide an "authorization to proceed" notice after review and approval of the SWPPP.
- g. Before submitting a NOT, permittees must certify to the Pueblo's Department of Natural Resources in writing that requirements for site stabilization have been met, and any temporary erosion control structures have been removed. Documentation of the Pueblo's review that such requirements have been reviewed and met will be provided for the permittee to add to the permittee's NOT submission to EPA. Copies of all NOT submitted to the EPA must also be sent to the Pueblo at the address provided above.
- **9.4.2.4 Pueblo of Santa Clara.** The following conditions apply only to discharges on the Pueblo of Santa Clara Reservation:
  - a. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Santa Clara Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency.
  - b. A copy of the Storm water Pollution Prevention Plan shall be made available to the Pueblo of Santa Clara staff upon request.
- **9.4.2.5 Pueblo of Tesuque.** The following conditions apply only to discharges on the Pueblo of Tesuque Reservation:
  - a. The operator shall provide a copy of the Notice of Intent (NOI) to the Pueblo of Tesuque Governor's Office and Environment Department at same time it is submitted to the Environmental Protection Agency, for projects occurring within the exterior boundaries of our tribal lands. The operator shall also notify the Pueblo of Tesuque Governor's Office and Environment Department when it submitted the Notice of Termination. The NOI and NOT shall be sent to the Pueblo of Tesuque Governor's Office and Environment Department at the following address:

Pueblo of Tesuque Office of the Governor Route 42 Box 360-T Santa Fe, NM 87506 or

email: governor@pueblooftesuque.org

- b. The operator shall also provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Pueblo of Tesuque Environment Department.
- **9.4.2.6 Taos Pueblo.** The following conditions apply only to discharges on the Taos Pueblo Reservation:
  - a. The operator shall provide a copy of the Notice of Intent (NOI) to the Taos Pueblo Governor's Office, War Chief's Office and Environmental Office, at the same time it is submitted to the U.S. Environmental Protection Agency, for projects occurring within the exterior boundaries of Taos Pueblo. The operator shall also notify Taos Pueblo when it has submitted the Notice of Termination (NOT). The NOI and NOT shall be sent to the Taos Pueblo at the following addresses:
    - i. Taos Pueblo Governor's Office P.O. Box 1846 Taos NM 87571
    - ii. Taos Pueblo War Chief's Office P.O. Box 2596 Taos NM 87571
    - Environmental OfficeAttn: Program MangerP.O. Box 1846Taos NM 87571
  - b. Taos Pueblo requests that in the event Indian artifacts or human remains are inadvertently discovered on projects occurring near or on Taos Pueblo lands that consultation with the tribal Governor's Office occur at the earliest possible time.
  - c. The operator shall provide a copy of the Stormwater Pollution Prevention Plan, copies of inspections reports, and copies of corrective action reports to staff in the Taos Pueblo Environmental Office for review and copy, upon request.
- **9.4.2.7 Ohkay Owingeh.** The following conditions apply only to discharges on the Ohkay Owingeh Reservation:
  - a. Prior to commencement of any construction activity on Ohkay Owingeh Lands requiring permit coverage under EPA's Construction General Permit, the operator(s) shall submit to Ohkay Owingeh Office of Environmental Affairs, a copy of the electronic "Notice of Intent," submitted to the Environmental Protection Agency, immediately following EPA's electronic notification that the NOI has been received. A copy of the Stormwater Pollution Prevention Plan(s) must be made available to the Ohkay Owingeh Office of Environmental Affairs upon the tribe's request either electronically or hard copy. Operator(s) shall also submit to Ohkay Owingeh Office of Environmental Affairs a copy of the electronic Notice of Termination (NOT) submitted to the Environmental Protection Agency. Documents shall be submitted to Ohkay Owingeh at the following address:

Ohkay Owingeh Office of Environment Affairs Attention: Environmental Programs Manager P.O. Box 717 Ohkay Owingeh, New Mexico 87566 Office # 505.852.4212 Fax # 505.852.1432 Electronic mail: naomi.archuleta@ohkay.org

- b. Ohkay Owingeh will not allow the Rainfall Erosivity Waivers (see Appendix C) to be granted for any small construction activities.
- c. All vegetation used to prevent soil loss, seeding or planting of the disturbed area(s) to meet the vegetative stabilization requirements must utilize native seeds/vegetation commonly known to the area. All temporary erosion control structures, such as silt fences must be removed as soon as stabilization requirements are met.

## 9.4.3 OKR101000 Indian country within the State of Oklahoma

- **9.4.3.1 Pawnee Nation.** The following conditions apply only to discharges within Pawnee Indian country:
  - a. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety P.O. Box 470
Pawnee, OK 74058
Or email to <a href="mailto:mmatlock@pawneenation.org">mmatlock@pawneenation.org</a>

- b. The Storm Water Pollution Prevention Plan must be available to Departmental inspectors upon request.
- c. The Department must be notified at 918.762.3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.
- 9.4.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).
  - a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.
  - b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.

c. In order to company with Oklahoma's Water Quality Standards, these conditions and restrictions also apply to any construction projects located wholly or partially on Indian Country lands within the State of Oklahoma.

#### 9.5 EPA REGION 8

## 9.5.1 MTR101000 Indian country within the State of Montana

- **9.5.1.1 The Confederated Salish and Kootenai Tribes of the Flathead Nation.** The following conditions apply only to discharges on the Confederated Salish and Kootenai Tribes of the Flathead Nation Reservation:
  - a. Permittees must submit the Stormwater Pollution Prevention Plan (SWPPP) to the Confederated Salish and Kootenai Tribes at least 30 days before construction starts.
  - b. Before submitting the Notice of Termination (NOT), permittees must clearly demonstrate to an appointed Tribal staff person during an onsite inspection that requirements for site stabilization have been met.
  - c. The permittee must send a copy of the Notice of Intent (NOI) and the NOT to CSKT.
  - d. Permittees may submit their SWPPPs, NOIs and NOTs electronically to: clintf@cskt.org.
  - e. Written SWPPPs, NOIs and NOTs may be mailed to:

Clint Folden, Water Quality Regulatory Specialist Confederated Salish and Kootenai Tribes Natural Resources Department P.O. Box 278 Pablo, MT 59855

#### 9.6 EPA REGION 9

## 9.6.1 CAR101000 Indian country within the State of California

- **9.6.1.1 Twenty-Nine Palms Band of Mission Indians.** The following conditions apply only to discharges on the Twenty-Nine Palms Band of Mission Indians Reservation:
  - a. At the time the applicant submits its Notice of Intent (NOI) to the EPA, the applicant must concurrently submit written notification of the NOI and a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Twenty-Nine Palms Band of Mission Indians at the address below:

Tribal Environmental Coordinator Twenty-Nine Palms Band of Mission Indians 46-200 Harrison Place Coachella, CA 92236

- b. The applicant must also concurrently submit to the Tribal Environmental Coordinator written notification of any other forms or information submitted to the EPA, including waivers, reporting, and Notice of Termination (NOT).
- c. Permitted entities under the CGP must keep the Tribal EPA informed of authorized discharges under the CGP by submitting written information about the type, quantity, frequency and location, intended purpose, and potential human health and/or environmental effects of their activities. These requirements are pursuant to Section 4 of the Twenty-Nine Palms Band of Mission Indians Water Pollution Control Ordinance (022405A). This information may be submitted to Tribal EPA in the form of Stormwater Pollution Prevention Plans (SWPPPs), monitoring reports, or other reports as required

under the CGP. Spills, leaks, or unpermitted discharges must be reported in writing to Tribal EPA within 24 hours of the incident.

- **9.6.2 GUR100000 Island of Guam.** The following conditions apply only to discharges on the Island of Guam:
  - a. Any earth-moving operations which require a permit must be obtained from the Department of Public Works (DPW) with clearance approval from various Government of Guam Agencies including Guam EPA prior to the start of any earth-moving activity.
  - b. In the event that the construction sites are within the Guam Sole Source Aquifer, the construction site owner and operator must consider opportunities to facilitate groundwater recharge for construction and post-construction implementing infiltration Best Management Practices. Stormwater disposal systems shall be designed and operated within the boundaries of the project. Stormwater systems shall not be permitted within any Wellhead Protection Zone unless the discharge meets the Guam Water Quality Standards within the zone. Waters discharged within the identified category G-2 recharge zone shall receive treatment to the degree required to protect the drinking water quality prior to it entering the category G-1 resource zone.
  - c. All conditions and requirements set forth in the 22 Guam Administrative Rules and Regulations (GARR), Division II, Water Control, Chapter 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR) that are more protective than the CGP regarding construction activities must be complied with.
  - d. All standards and requirements set forth in the 22 GARR, Division II, Water Control, Chapter 5, Guam Water Quality Standards (GWQS) 2001 Revisions, must be complied with to include reporting GWQS exceedance to Guam EPA.
  - e. All operators/owners of any property development or earth moving activities shall comply with the erosion control pre-construction and post-construction BMP design performance standards and criteria set forth in the 2006 CNMI and Guam Stormwater Management Manual.
  - f. All conditions and requirements regarding dewatering activities set forth in 22 Guam Administrative Rules and Regulations Chapter 7, Water Resources Development and Operating Regulations must be complied with to include securing permits with Guam EPA prior to the start of any dewatering activities.
  - g. If a project to be developed is covered under the Federal Stormwater Regulations (40 CFR Parts 122 & 123), a Notice of Intent (NOI) to discharge stormwater to the surface and marine waters of Guam must be submitted to the U.S. EPA and a copy furnished to Guam EPA, pursuant to Section 10, 104(B)(5)(d) 22GAR, Division II, Chapter 10.
  - h. Guam EPA shall apply the Buffer Requirements listed in Appendix G of the CGP NPDES Permit for construction activities as it pertains to Waters of the U.S. in Guam. Guam EPA shall also apply the same buffer requirements for sinkholes in Guam.
  - i. When Guam EPA, through its permit review process, identifies that the proposed construction activity is close proximity to marine waters, contractors and owners will be informed that any activity that may impair water quality are required to stop

- during peak coral spawning periods as per the Guam Coral Spawning Construction Moratoriums.
- j. The Proposed Construction General Permit must set appropriate measures and conditions to protect Guam's Threatened and Endangered Species and Outstanding Resource Waters of exceptional recreational or ecological significance as determined by the Guam EPA Administrator as per Guam Water Quality Standards 2001 Revisions, §5102, Categories of Waters, D. Outstanding Resource Waters.
- k. When Guam EPA through its permit review process identifies that proposed construction activity is in close proximity to any Section 303d impaired waters, which includes marine waters and surface waters, shall ensure that construction activity does not increase the impaired water's ambient parameters.
- I. When Rainfall Erosivity and TMDL Waivers reflected in the CGP, Appendix C, are submitted to the U.S. EPA, Guam EPA will review waivers on a project by project basis.
- m. Prior to submission of the Notice of Termination (NOT) to the U.S. EPA, permittees must clearly demonstration to Guam EPA that the project site has met all soil stabilization requirements and removal of any temporary erosion control as outlined in the GSESCR.

## 9.7 EPA REGION 10

## 9.7.1 IDR100000 State of Idaho, except Indian country

- a. <u>Idaho's Antidegradation Policy</u>. The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).
  - 1. Tier I Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05).
  - 2. Tier II Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
  - 3. Tier III Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).
    DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use, unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).
- b. <u>Pollutants of Concern.</u> The primary pollutants of concern associated with stormwater discharges from construction activities are sediment, typically measured as total suspended solids and turbidity. Other potential pollutants include the following:

- phosphorus, nitrogen, pesticides, organics, metals, PCBs, petroleum products, construction chemicals, and solid wastes.
- c. <u>Receiving Water Body Level of Protection</u>. The CGP provides coverage to construction activities throughout the entire State of Idaho. Because of the statewide applicability, all of the jurisdictional waters within Idaho could potentially receive discharges either directly or indirectly from activities covered under the CGP. DEQ applies a water body by water body approach to determine the level of antidegradation a water body will receive.

All waters in Idaho that receive discharges from activities authorized under the CGP will receive, at minimum Tier I antidegradation protection because Idaho's antidegradation policy applies to all waters of the state. Water bodies that fully support their aquatic life or recreational uses are considered to be high quality waters and will receive Tier II antidegradation protection.

Although Idaho does not currently have any Tier III designated outstanding resource waters (ORWs) designated, it is possible for a water body to be designated as an ORW during the life of the CGP. Because of this potential, the antidegradation review also assesses whether the permit complies with the outstanding resource water requirements of Idaho's antidegradation policy.

To determine the support status of the receiving water body, persons filing a Notice of Intent (NOI) for coverage under this general permit must use the most recent EPA-approved Integrated Report, available on Idaho DEQ's website: <a href="http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report/">http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report/</a>.

High quality waters are identified in Categories 1 and 2 of the Integrated Report. If a water body is in either Category 1 or 2, it is a Tier II water body.

Unassessed waters are identified as Category 3 of DEQ's Integrated Report. These waters require a case-by-case determination to be made by DEQ based on available information at the time of the application for permit coverage. If a water body is unassessed, the applicant is directed to contact DEQ for assistance in filing the NOI.

Impaired waters are identified in Categories 4 and 5 of the Integrated Report. Category 4(a) contains impaired waters for which a TMDL has been approved by EPA. Category 4(b) contains impaired waters for which controls other than a TMDL have been approved by EPA. Category 5 contains waters which have been identified as "impaired," for which a TMDL is needed. These waters are Tier I waters, for the use which is impaired. With the exception, if the aquatic life uses are impaired for any of these three pollutants—dissolved oxygen, pH, or temperature—and the biological or aquatic habitat parameters show a health, balanced biological community, then the water body shall receive Tier II protection, in addition to Tier I protection, for aquatic life uses (IDAPA 58.01.02.052.05.c.i.).

DEQ's webpage also has a link to the state's map-based Integrated Report which presents information from the Integrated Report in a searchable, map-based format: <a href="http://www.deq.idaho.gov/assistance-resources/maps-data/">http://www.deq.idaho.gov/assistance-resources/maps-data/</a>.

Water bodies can be in multiple categories for different causes. If assistance is needed in using these tools, or if additional information/clarification regarding the

support status of the receiving water body is desired, the operator is directed to make contact with the appropriate DEQ regional office of the State office in the table below:

Regional and State Office	Address	Phone Number	Email
Boise	1445 N. Orchard Rd., Boise 83706	208-373-0550	Kati.carberry@deq.idaho.gov
Coeur d'Alene	2110 Ironwood Parkway, Coeur D'Alene 83814	208-769-1422	June.bergquist@deq.idaho.gov
Idaho Falls	900 N. Skyline, Suite B., Idaho Falls 83402	208-528-2650	Troy.saffle@deq.idaho.gov
Lewiston	1118 "F" St., Lewiston 83501	208-799-4370	Mark.sellet@deq.idaho.gov
Pocatello	444 Hospital way, #300 Pocatello 83201	208-236-6160	Lynn.vanevery@deq.idaho.gov
Twin Falls	650 Addison Ave., W., Suite 110, Twin Falls 83301	208-736-2190	Balthasar.buhidar@deq.idaho.gov
State Office	1410 N. Hilton Rd., Boise 83706	208-373-0502	Nicole.deinarowicz@deq.idaho.gov

d. <u>Turbidity Monitoring</u>. The permittee must conduct turbidity monitoring during construction activities and thereafter on days where there is a direct discharge of pollutants from an unstabilized portion of the site which is causing a visible plume to a water of the U.S.

A properly and regularly calibrated turbidimeter is required for measurements analyzed in the field (preferred method), but grab samples may be collected and taken to a laboratory for analysis. If the permittee can demonstrate that there will be no direct discharge from the construction site, then turbidity monitoring is not required. When monitoring is required, a sample must be taken at an undisturbed area immediately upstream of the project area to establish background turbidity levels for the monitoring event. Background turbidity, location, date and time must be recorded prior to monitoring downstream of the project area. A sample must also be taken immediately downstream from any point of discharge and within any visible plume. The turbidity, location, date and time must be recorded. The downstream sample must be taken immediately following the upstream sample in order to obtain meaningful and representative results.

Results from the compliance point sampling or observation<sup>78</sup> must be compared to the background levels to determine whether project activities are causing an exceedance of state WQS. If the downstream turbidity is 50 NTUs or more than the upstream turbidity, then the project is causing an exceedance of WQS. Any exceedance of the turbidity standard must be reporting to the appropriate DEQ regional office within 24 hours. The following six (6) steps should be followed to ensure compliance with the turbidity standard:

- 1. If a visible plume is observed, quantify the plume by collecting turbidity measurements from within the plume and compare the results to Idaho's instantaneous numeric turbidity criterion (50 NTU over the background).
- 2. If turbidity is less than 50 NTU instantaneously over the background turbidity; continue monitoring as long as the plume is visible. If turbidity exceeds background turbidity by more than 50 NTU instantaneously then stop all earth disturbing construction activities and proceed to step 3.
- 3. Take immediate action to address the cause of the exceedance. That may include inspection the condition of project BMPs. If the BMPs are functioning to their fullest capability, then the permittee must modify project activities and/or BMPs to correct the exceedance.
- 4. Notify the appropriate DEQ regional office within 24 hours.
- 5. Possibly increase monitoring frequency until state water quality standards are met.
- 6. Continue earth disturbing construction activities once turbidity readings return to within 50 NTU instantaneously <u>and</u> 25 NTU for more than ten consecutive days over the background turbidity.

Copies of daily logs for turbidity monitoring must be available to DEQ upon request. The report must describe all exceedances and subsequent actions taken, including the effectiveness of the action.

e. Reporting of Discharges Containing Hazardous Materials or Petroleum Products. All spills of hazardous material, deleterious material or petroleum products which may impact waters (ground and surface) of the state shall be immediately reported. Call 911 if immediate assistance is required to control, contain or clean up the spill. If no assistance is needed in cleaning up the spill, contact the appropriate DEQ regional office in the table below during normal working hours or Idaho State Communications Center after normal working hours. If the spilled volume is above federal reportable quantities, contact the National Repose Center.

For immediate assistance: Call 911

National Response Center: (800) 424-8802

Idaho State Communications Center: (800) 632-8000

<sup>&</sup>lt;sup>78</sup> A visual observation is only acceptable to determine whether BMPs are functioning properly. If a plume is observed, the project may be causing an exceedance of WQS and the permittee must collect turbidity data and inspect the condition of the projects BMPs. If the BMPs appear to be functioning to their fullest capability and the turbidity is 50 NTUs or more than the upstream turbidity, then the permittee must modify the activity or implement additional BMPs (this may also include modifying existing BMPs).

Regional office	Toll Free Phone Number	Phone Number
Boise	888-800-3480	208-373-0550
Coeur d'Alene	877-370-0017	208-769-1422
Idaho Falls	800-232-4635	208-528-2650
Lewiston	977-547-3304	208-799-4370
Pocatello	888-655-6160	208-236-6160
Twin Falls	800-270-1663	208-736-2190

# 9.7.2 IDR101000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)

- **9.7.2.1 Shoshone-Bannock Tribes.** The following conditions apply only to discharges on the Shoshone-Bannock Reservation:
  - f. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Shoshone-Bannock Tribes Water Resources Department at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Shoshone-Bannock Tribes Water Resources Department the acknowledgement of receipt of the NOI from the EPA within 7 calendar days of receipt from the EPA.
- 9.7.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator. The following conditions apply only to discharges on federal facilities in the State of Washington:
  - a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201 A WAC), groundwater quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.
  - b. Prior to the discharge of stormwater and non-storm water to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate SWPPP, with all appropriate BMPs installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.
  - c. Permittees who discharge to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter Identified in 303(d) Listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
<ul><li>Turbidity</li><li>Fine Sediment</li><li>Phosphorus</li></ul>	Turbidity	NTU	SM2130 or EPA 180.1	25 NTUs at the point where the stormwater is discharged from the site.
High pH	рН	Su	pH meter	In the range of 6.5 – 8.5

- d. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA approved listing of impaired waters that exists on February 16, 2017, or the date when the operator's complete permit application is received by EPA, whichever is later.
- e. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.
  - i. Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements establish by the applicable TMDL.
  - ii. Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.
  - iii. Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
  - iv. Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.
  - v. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to February 16, 2017, or prior to the date the operator's complete NOI is received by EPA, whichever is later.

## 9.7.4 WAR101000 Indian country within the State of Washington

- **9.7.4.1 Confederated Tribes of the Colville Reservation.** The following conditions apply only to discharges on the Colville Indian Reservation (CIR) and on other Tribal trust lands or allotments of the Confederated Tribes of the Colville Reservation:
  - a. A copy of the Stormwater Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Environmental Trust Department Confederated Tribes of the Colville Reservation PO Box 150 Nesepelem, WA 99155

- b. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be sent to the ETD at the same time they are submitted to EPA.
- c. Discharges to Omak Creek, the Okanogan River, and Columbia River downstream of Chief Joseph Dam may affect threatened or endangered species, and shall only be permitted in adherence with Appendix D of the CGP.
- d. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in Chapter 4-8 Water Quality Standards of the Colville Law and Order Code, as amended.

- e. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the CIR. All spills must be reported to the appropriate emergency management agency and the ETD, and measures shall be taken immediately to prevent the pollution of waters of the CIR, including groundwater.
- f. Stormwater site inspections shall be conducted at least once every 7 calendar days, within 24-hours of the occurrence of a rain event of 0.25 inches or greater in a 24-hour period, and daily during periods of saturated ground surface or snowmelt with accompanying surface runoff.
- g. Results of discharge sampling must be reported to the ETD within 7 days of sample collection. All sample reporting must include the date and time, location, and individual performing the sampling.
- h. Any corrective action reports that are required under the CGP must be submitted to the ETD at the above address within one (1) working day of the report completion.
- i. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or proprieties that may be eligible for such listing.

## **9.7.4.2 Lummi Nation.** The following conditions apply only to discharges on the Lummi Reservation:

- a. The Lummi Nation reserves the right to modify this 401 certification if the final version of the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (CGP) on tribal lands in the State of Washington (Permit No. WAR101000) is substantively different than the draft version of the proposed permit that was made available for public comments during April 2016. The Lummi Nation will determine if the final version of the NPDES CGP is substantively different than the draft version following review of the final version once the EPA makes it available.
- b. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.
- c. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.
- d. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).
- e. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.

- f. Each operator shall submit a signed hard copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.
- g. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department ATTN: Water Resources Manager 2665 Kwina Road Bellingham, WA 98226-9298

- **9.7.4.3 Makah Tribe.** The following conditions apply only to discharges on the Makah Reservation:
  - a. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.
  - b. The operator shall submit a Storm Water Pollution Prevention Plan to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.
  - c. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.
  - d. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Aaron Parker
Makah Fisheries Management Water Quality Specialist
(360) 645-3162
Cell 206-356-0319
Aaron.parker@makah.com
PO Box 115
Neah Bay WA 98357

- **9.7.4.4 Puyallup Tribe of Indians.** The following conditions apply only to discharges on the Puyallup Tribe of Indians Reservation:
  - a. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to lower water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures. The Tribe may also impose additional controls on a site-specific basis, or request EPA to require the operator obtain coverage under an individual permit, if information in the NOI or from other sources indicates that the operator's discharges are not controlled as necessary to meet applicable water quality standards.
  - b. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.

c. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor (<a href="mailto:char.naylor@puyalluptribe.com">char.naylor@puyalluptribe.com</a>) and Russ Ladley (<a href="mailto:russ.ladley@puyalluptribe.com">russ.ladley@puyalluptribe.com</a>) by email or at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians 3009 E. Portland Avenue Tacoma, WA 98404 ATTN: Russ Ladley and Char Naylor

- d. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Resource Protection Manager (<a href="mailto:russ.ladley@puyalluptribe.com">russ.ladley@puyalluptribe.com</a>) and Char Naylor (<a href="mailto:char.naylor@puyalluptribe.com">char.naylor@puyalluptribe.com</a>) for review.
- e. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Russ Ladley and Char Naylor at the address listed above.
- f. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to tribal waters.
- g. The permittee shall conduct benchmark monitoring for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH monitoring as well. Monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.13-20) of the Washington State Construction Stormwater General Permit, effective January 1, 2016, shall apply, as applicable.
- h. The permittee shall notify Char Naylor (253-680-5520) and Russ Ladley (253-680-5560) prior to conducting inspections at construction sites generating storm water discharged to tribal waters.
- i. Treat dewatering discharges with controls necessary to minimize discharges of pollutants in order to minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or other storage areas. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.
  - To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11 of EPA's 2016 General Construction Stormwater Permit. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.
- j. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the site's earth disturbances. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

- **9.7.4.5 Spokane Tribe of Indians.** The following conditions apply only to discharges on the Spokane Tribe Reservation:
  - a. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;
  - b. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.
  - c. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.
  - d. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA.

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board c/o. Brian Crossley P0 Box 480 Wellpinit WA 99040 (509)626-4409 crossley@spokanetribe.com

**9.7.4.6 Swinomish Indian Tribal Community.** The following conditions apply only to discharges on the Swinomish Reservation:

- a. Owners and operators seeking coverage under this permit who intend to discharge to Regulated Surface Waters must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.
- b. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.
- c. Owners and operators must also submit to the DEP Changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.
- **9.7.4.7 Tulalip Tribes.** The following conditions apply only to discharges on the Tulalip Reservation:
  - a. This certification does not exempt and is provisional upon compliance with other applicable statues and codes administered by federal and Tulalip tribal agencies. Pursuant to Tulalip Tribes code of law, the operator must also obtain a land use permit from the Tulalip Tribes Planning Department as provided in Title 7 of the Tulalip Tribal Code (http://www.codepublishing.com/WA/Tulalip/?Tulalip02/Tulalip0205.html).
  - b. Each CGP operator shall be responsible for achieving compliance with Tulalip Tribes Water Quality Standards.
  - c. Each CGP operator shall submit their Stormwater Pollution Prevention Plan (SWPPP) to the:

Tulalip Natural & Cultural Resources Department Tulalip Tribes 6406 Marine Drive Tulalip, WA 98271

## Appendix C – Copy of NOI TPDES General Permit

**TCEQ Office Use Only** 

Permit No.: RN: CN: Region:

**RESET FORM** 

**TCEQ** Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

## **IMPORTANT:**

- Use the <u>INSTRUCTIONS</u> to fill out each question in this form.
- Use the <u>CHECKLIST</u> to make certain you filled out all required information. Incomplete applications **WILL** delay approval or result in denial.
- Once processed your permit can be viewed at: <a href="http://www.tceq.texas.gov/goto/wq-dpa">http://www.tceq.texas.gov/goto/wq-dpa</a>

**ePERMITS:** Sign up now for online NOI: <a href="https://www3.tceq.texas.gov/steers/">https://www3.tceq.texas.gov/steers/</a> Pay a \$225 reduced application fee by using ePermits.

## **APPLICATION FEE:**

- You must pay the **\$325** Application Fee to TCEQ for the paper application to be complete.
- Payment and NOI must be mailed to separate addresses.
- Did you know you can pay on line?
  - Go to <a href="http://www.tceg.texas.gov/goto/epay">http://www.tceg.texas.gov/goto/epay</a>
  - Select Fee Type: GENERAL PERMIT CONSTRUCTION STORM WATER DISCHARGE NOI APPLICATION

	Discinic	GE NOTAL LICHTION
•	<u>Pr</u> ovide you	r payment information below, for verification of payment:
	☐ Mailed	Check/Money Order Number:
		Name Printed on Check:
		Name Printed on Check:  Copy of check enclosed?  Yes
	$\square$ EPAY	Voucher Number:
		Is the Payment Voucher copy attached?  Yes
		s NOI a Renewal of an existing General Permit Authorization? Innot be renewed after June 3, 2013.)
$\square$	es The Permi	t number is: TXR15
		nit number is not provided, a new number will be assigned.)
$\square$	No	int number is not provided, a new number will be assigned.)
_ ^		
1) (	PERATOR (Ap	plicant)
		currently a customer with TCEQ, what is the Customer Number (CN)
		ty? You may search for your CN at:
		texas.gov/goto/cr-customer
_		
(	CN	
		<del></del>

b)	Wha	t is the L	egal Name of the	e entity (applicant) appl	ying for this permit?	
			ne must be spell ocument forming		the Texas Secretary of State, County	, or
c)	Wha addr	t is the cores must	ontact information be recognized by usps.com/go/Zi	on for the Operator (Re y the US Postal Service pLookupAction!input.a	sponsible Authority)? The mailing (USPS). You may verify the address ction	at:
	Prefi	ix (Mr. M	s. Miss):			
	First	/Last Na	me:		Suffix:	
	Title	<u>:</u>			Credential:	
	Phor	ne Numbe	er:	Ext:	Suffix:Credential:Fax Number:	
	E-ma	ail:				
	Mail	ing Addro	ess:			
	Inter	rnal Rout	ing (Mail Code, l	Etc.):	ZIP Code:	
	City:			State:	ZIP Code:	
	If ou	tside USA	A:			
	Terr	itory:		Country Code:_	Postal Code:	
d)	Indi	cate the t	ype of Customer	(The instructions will h	nelp determine your customer type):	
		Individu	ıal	Limited Partnersh	nip Sole Proprietorship-DBA	1
		Joint Ve	enture	General Partnersh	nip Corporation	
		Trust		☐ Estate	Federal Government	
		State Go	overnment	County Governme	ent City Government	
			overnment	County Governme	ent Covernment	
				. 1 1		
e)	chec	pendent k "No".) Yes	Operator? (If go	vernmental entity, subs	sidiary, or part of a larger corporation	n,
f)		nber of Er 0-20;	mployees:	□ 101-250; □ 2	251-500; or 501 or higher	
g)	(REC Gove State Fede Texa	QUIRED ernment, e Franchie Fral Tax II s Secreta	or Sole Proprieto se Tax ID Numb D: ry of State Chart	s and Limited Partnershors) er: ter (filing) Number:	nips. Not Required for Individuals,	
	DUN	io manno	CI (II KIIOWII)			
2)	APP	LICATIO	ON CONTACT			
If T	CEQ	needs ad	ditional informa	ation regarding this app	lication, who should be contacted?	
Is t	he ap	plication	contact the sam	e as the applicant ident	rified above?	
	Yes,	go to Sec	tion 3).			
	No, o	complete	section below			

Pre	efix (Mr. Ms. Miss):			
Fir	st/Last Name:		Suffix:	
Tit	le:		Credential:	
Org	ganization Name:		Fax Number:	
Pho	one Number:	Ext:	Fax Number:	
E-r	mail:			
Ma	alling Address:			
Int	ternal Routing (Mail Code, Etc.):	Chata.	ZID Co do:	
Mo	y:	State:	ZIP Code:	
Tot	rritory	ountry Codo	Postal Code:	
161	intoryC	ountry code	rostar code	
၁)	REGULATED ENTITY (RE) INF	ORMATIONO	N PROJECT OR SITE	
			te or if other businesses were located at	t
			may already be assigned for the larger	
			EQ's Central Registry to see if the large	-p
	e may already be registered as a regu			-
	p://www.tceg.texas.gov/goto/cr-sea			
	F-/,			
If t	he site is found, provide the assigned	d Regulated Entit	ty Reference Number and provide the	
			plication below. The site information	
	this authorization may vary from th			
۵)	TCEO issued DE Peference Number	n(DN). DN		
a)	TCEQ issued RE Reference Number	i (KN). KN		
P)	Name of project or site (the name k	nown by the com	munity where located):	
U)	Name of project of site (the name k	nown by the con	mumity where located).	
	-			
c)	In your own words, briefly describe	the primary bus	iness of the Regulated Entity: (Do not	
υ,	repeat the SIC and NAICS code):	the primary sus	moss of the Regulated Entity. (20 not	
	7			_
d)	County (or counties if > 1)			
e)	Latitude:	Lon	gitude:	
^	B d 2-1 1 1 1 11	0		
f)	Does the site have a physical addres	SS?		
	Yes, complete Section A for a ph	ysical address.		
	☐ No, complete section B for site l	ogation informat	ion	
	No, complete section B for site i	ocation illiorillat	1011.	
	<b>Section A:</b> Enter the physical ad-	dross for the site		
	Verify the address with USPS If the	address is not re	ecognized as a delivery address, provid	6
	the address as identified for overnic	tht mail delivery	911 emergency or other online map	ıc
	tools to confirm an address.	siit iiiaii deiively,	311 chief ency of other online map	
	Physical Address of Project or Site:			
	Street Number: S	Street Name:	te: Texas ZIP Code:	
	City·	Sta	te· Texas ZIP Code·	

	<b>Section B:</b> Enter the site location information.  If no physical address (Street Number & Street Name), provide a written location access description to the site. (Example: located 2 miles west from intersection of Hwy 290 & IH35 accessible on Hwy 290 South)
	City where the site is located or, if not in a city, what is the nearest city:
	State: Texas ZIP Code where the site is located:
4)	GENERAL CHARACTERISTICS
	Is the project/site located on Indian Country Lands?  Yes - If the answer is Yes, you must obtain authorization through EPA, Region 6.  No
<b>b</b> )	Is your construction activity associated with a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources?  Yes - If the answer is Yes, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization through EPA, Region 6.
c)	What is the Primary Standard Industrial Classification (SIC) Code that best describes the construction activity being conducted at the site?  Primary SIC Code:
d)	If applicable, what is the Secondary SIC Code(s):
<b>e</b> )	What is the total number of acres disturbed?
f)	Is the project site part of a larger common plan of development or sale?  ☐ Yes - If the answer is Yes, the total number of acres disturbed can be less than 5 acres.  ☐ No - If the answer is No, the total number of acres disturbed must be 5 or more. If the total number of acres disturbed is less than 5 then the project site does not qualify
	for coverage through this Notice of Intent. Coverage will be denied. See the requirements in the general permit for small construction sites.
g)	What is the name of the first water body(s) to receive the stormwater runoff or potential runoff from the site?
h)	What is the segment number(s) of the classified water body(s) that the discharge will eventually reach?

I)	Yes - If the answer is Yes, provide the name of the MS4 operator below.
	Note: The general permit requires you to send a copy of the NOI to the MS4 operator.  No
j)	Are any of the surface water bodies receiving discharges from the construction site on the latest EPA-approved CWA 303(d) List of impaired waters?  Yes - If the answer is Yes, provide the name(s) of the impaired water body(s) below.
	□ No
k)	Is the discharge or potential discharge within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer as defined in 30 TAC Chapter 213?  Yes - If the answer is Yes, complete certification below by checking "Yes."
	□ No
	I certify that a copy of the TCEQ approved Plan required by the Edwards Aquifer Rule (30 TAC Chapter 213) is either included or referenced in the Stormwater Pollution Prevention Plan.  Yes

Ch	<b>CERTIFICATION</b> eck Yes to the certifications below. Failure to indicate Yes to <b>ALL</b> items may result coverage under the general permit.	in denial
a)	I certify that I have obtained a copy and understand the terms and conditions of the Construction General Permit (TXR150000).	Yes
b)	I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas.	Yes
c)	I understand that a Notice of Termination (NOT) must be submitted when this authorization is no longer needed.	Yes
d)	I certify that a Stormwater Pollution Prevention Plan has been developed, will be implemented prior to construction and to the best of my knowledge and belief is compliant with any applicable local sediment and erosion control plans, as required in the general permit TXR150000. Note: For multiple operators who operate under shared SWP3, the confirmation of an operator may be limited to its obligations under the SWP3 provided all obligations are confirmed by at least one operator.	
Op	erator Certification:	
I.		
-,	Typed or printed name Title	
dir pro per info acco info I fu and	rtify under penalty of law that this document and all attachments were prepared underection or supervision in accordance with a system designed to assure that qualified poperly gather and evaluate the information submitted. Based on my inquiry of the possible for gathering the formation, the information submitted is, to the best of my knowledge and belief, true curate, and complete. I am aware there are significant penalties for submitting false formation, including the possibility of fine and imprisonment for knowing violations are certify that I am authorized under <b>30 Texas Administrative Code §305.4</b> d submit this document, and can provide documentation in proof of such authorizatives.	personnel erson or e e c,
Sig	nature: Date: (Use blue ink)	

### NOTICE OF INTENT CHECKLIST (TXR150000)

- Did you complete everything? Use this checklist to be sure!
- Are you ready to mail your form to TCEQ? Go to the General Information Section of the Instructions for mailing addresses.

This checklist is for use by the operator to ensure a complete application. Missing information may result in denial of coverage under the general permit. (See NOI process description in the Instructions)

Application Fee:
If paying by Check:
Check was mailed <b>separately</b> to the TCEQs Cashier's Office. (See Instructions for
Cashier's address and Application address.)
Check number and name on check is provided in this application.
If u <u>sing</u> ePay:
The voucher number is provided in this application or a copy of the voucher is attached.
PERMIT NUMBER:
Permit number provided – if this application is for renewal of an existing authorization.
OPERATOR INFORMATION - Confirm each item is complete:
Customer Number (CN) issued by TCEQ Central Registry
Legal name as filed to do business in Texas (Call TX SOS 512/463-5555)
Name and title of responsible authority signing the application
Mailing address is complete & verifiable with USPS. www.usps.com
Phone numbers/e-mail address
Type of operator (entity type)
Independent operator
Number of employees
For corporations or limited partnerships – Tax ID and SOS filing numbers
Application contact and address is complete & verifiable with USPS. <a href="http://www.usps.com">http://www.usps.com</a>
REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE - Confirm each item is
complete:
Regulated Entity Reference Number (RN) (if site is already regulated by TCEQ)
Site/project name/regulated entity
Latitude and longitude <a href="http://www.tceq.texas.gov/gis/sqmaview.html">http://www.tceq.texas.gov/gis/sqmaview.html</a>
County
Site/project physical address. Do not use a rural route or post office box.
Business description
GENERAL CHARACTERISTICS - Confirm each item is complete:
☐ Indian Country Lands —the facility is not on Indian Country Lands
Construction activity related to facility associated to oil, gas, or geothermal resources
Standard Industrial Classification (SIC) Code <a href="https://www.osha.gov/oshstats/sicser.html">www.osha.gov/oshstats/sicser.html</a>
Acres disturbed is provided and qualifies for coverage through a NOI
Common plan of development or sale
Receiving water body(s)
Segment number(s)
Impaired water body(s)
MS4 operator
Edwards Aquifer rule
CERTIFICATION
Certification statements have been checked indicating "Yes"
Signature meets 30 Texas Administrative Code (TAC) 305.44 and is original.

### Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under TPDES General Permit (TXR150000)

**General Information and Instructions** 

### GENERAL INFORMATION

### Where to Send the Notice of Intent (NOI):

BY REGULAR U.S. MAIL BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)

Texas Commission on Environmental Quality
Stormwater Processing Center (MC-228)

P.O. Box 13087 12100 Park 35 Circle Austin, Texas 78711-3087 Austin, TX 78753

**TCEQ Contact List:** 

Application – status and form questions: 512/239-3700, <a href="mailto:swpermit@tceq.texas.gov">swpermit@tceq.texas.gov</a>

Technical questions: 512/239-4671, <a href="mailto:swgp@tceq.texas.gov">swgp@tceq.texas.gov</a>

Environmental Law Division: 512/239-0600 Records Management - obtain copies of forms: 512/239-0900

Reports from databases (as available): 512/239-DATA (3282)

Cashier's office: 512/239-0357 or 512/239-0187

### **Notice of Intent Process:**

When your NOI is received by the program, the form will be processed as follows:

- 1) **Administrative Review:** Each item on the form will be reviewed for a complete response. In addition, the operator's legal name must be verified with Texas Secretary of State as valid and active (if applicable). The address(s) on the form must be verified with the US Postal service as receiving regular mail delivery. Never give an overnight/express mailing address.
- 2) **Notice of Deficiency:** If an item is incomplete or not verifiable as indicated above, a notice of deficiency (NOD) will be mailed to the operator. The operator will have 30 days to respond to the NOD. The response will be reviewed for completeness.
- 3) **Acknowledgment of Coverage:** An Acknowledgment Certificate will be mailed to the operator. This certificate acknowledges coverage under the general permit.

**Denial of Coverage:** If the operator fails to respond to the NOD or the response is inadequate, coverage under the general permit may be denied. If coverage is denied, the operator will be notified.

### **General Permit (Your Permit)**

For NOIs submitted **electronically** through ePermits, provisional coverage under the general permit begins immediately following confirmation of receipt of the NOI form by the TCEQ.

For paper NOIs, provisional coverage under the general permit begins **7 days after a completed NOI is postmarked for delivery** to the TCEQ.

You should have a copy of your general permit when submitting your application. You may view and print your permit for which you are seeking coverage, on the TCEQ web site <a href="http://www.tceq.texas.gov">http://www.tceq.texas.gov</a>. Search using key word TXR150000.

### **General Permit Forms**

The Notice of Intent (NOI), Notice of Termination (NOT), and Notice of Change (NOC) (including instructions) are available in Adobe Acrobat PDF format on the TCEQ web site <a href="http://www.tceq.texas.gov">http://www.tceq.texas.gov</a>.

### **Change in Operator**

An authorization under the general permit is not transferable. If the operator of the regulated entity changes, the present permittee must submit a Notice of Termination and the new operator must submit a Notice of Intent. The NOT and NOI must be submitted no later than 10 days prior to the change in Operator status.

### **TCEQ Central Registry Core Data Form**

The Core Data Form has been incorporated into this form. Do not send a Core Data Form to TCEQ. After final acknowledgment of coverage under the general permit, the program will assign a Customer Number and Regulated Entity Number.

You can find the information on the Central Registry web site at <a href="http://www15.tceq.texas.gov/crpub/">http://www15.tceq.texas.gov/crpub/</a>. You can search by the Regulated Entity (RN), Customer Number (CN) or Name (Permittee), or by your permit number under the search field labeled "Program ID". Capitalize all letters in the permit number.

The Customer (Permittee) is responsible for providing consistent information to the TCEQ, and for updating all CN and RN data for all authorizations as changes occur. For General Permits, a Notice of Change form must be submitted to the program area.

### Fees associated with a General Permit

Payment of the fee may be made by check or money order, payable to TCEQ, or through EPAY (electronic payment through the web).

**Application Fee:** This fee is required to be paid at the time the NOI is submitted. Failure to submit payment at the time the application is filed will cause delays in acknowledgment or denial of coverage under the general permit.

### Mailed Payments:

Payment must be mailed under separate cover at one of the addresses below using the attached Application Fee submittal form. (DO NOT SEND A COPY OF THE NOI WITH THE APPLICATION FEE SUBMITTAL FORM)

### BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 P.O. Box 13088 Austin, Texas 78711-3088

### BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 12100 Park 35 Circle Austin, TX 78753

### ePAY Electronic Payment: <a href="http://www.tceq.texas.gov/epay">http://www.tceq.texas.gov/epay</a>

When making the payment you must select Water Quality, and then select the fee category "General Permit Construction Storm Water Discharge NOI Application". You must include a copy of the payment voucher with your NOI. Your NOI will not be considered complete without the payment voucher.

### INSTRUCTIONS FOR FILLING OUT THE NOI FORM

**Renewal of General Permit.** Dischargers holding active authorizations under the expired General Permit are required to submit a NOI to continue coverage. The existing permit number is required. If the permit number is not provided or has been terminated, expired, or denied a new permit number will be issued.

### 1. Operator (Applicant)

### a) Enter assigned Customer Number (CN)

TCEQ's Central Registry will assign each customer a number that begins with CN, followed by nine digits. **This is not a permit number, registration number, or license number**. If this customer has not been assigned a CN, leave the space for the CN blank. If this customer has already been assigned this number, enter the permittee's CN.

### b) Legal Name

Provide the current legal name of the permittee, as authorized to do business in Texas. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at 512/463-5555, for more information related to filing in Texas. If filed in the county where doing business, provide a copy of the legal documents showing the legal name.

### c) Operator Contact's (Responsible Authority) Contact Information and Mailing Address

Provide the first and last name, and the title of the person signing the Certification section of the application. This person must be an individual having signatory authority in accordance with 30 TAC Chapter §305.44. This person is also referred to as the Responsible Authority.

Provide a complete mailing address for receiving mail from the TCEQ. The address must be verifiable with the US Postal Service at

https://tools.usps.com/go/ZipLookupAction!input.action for regular mail delivery (not overnight express mail). If you find that the address is not verifiable using the USPS web search, please indicate the address is used by the USPS for regular mail delivery.

The area code and phone number should provide contact to the operator. Leave Extension blank if not applicable.

The fax number and e-mail address are optional and should correspond to the operator.

### d) Type of Customer (Entity Type)

Check only one box that identifies the type of entity. Use the descriptions below to identify the appropriate entity type. Note that the selected entity type also indicates the name that must be provided as an applicant for a permit, registration or authorization.

### **Sole Proprietorship – DBA**

A sole proprietorship is a customer that is owned by only one person and has not been incorporated. This business may:

- be under the person's name
- have its own name (doing business as or d.b.a.)
- have any number of employees

If the customer is a Sole Proprietorship or DBA, the 'legal name' of the individual business 'owner' must be provided. The DBA name is not recognized as the 'legal name' of the entity. The DBA name may be used for the site name (regulated entity).

### Individual

An individual is a customer who has not established a business, but conducts an activity that needs to be regulated by the TCEQ.

### **Partnership**

- A customer that is established as a partnership as defined by the Texas Secretary
  of State Office (TX SOS). A Limited Partnership or Limited Liability Partnership
  (Partnership) is required to file with the Texas Secretary of State. A General
  Partnership or Joint Venture is not required to register with the state.
- Partnership (Limited Partnership or Limited Liability Partnership): A limited partnership is defined in the Act as a partnership formed by two or more persons under the provisions of Section 3 of the Uniform Limited Partnership Act (Art. 6132a, Revised Civil Statutes of Texas) and having as members one or more general partners and one or more limited partners. The limited partners as such are not bound by the obligations of the partnership. Limited partners may not take part in the day-to-day operations of the business. A Limited Partnership must file with the Texas Secretary of State. A registered limited liability partnership is a general or limited partnership that is registered with the Texas Secretary of State. The partnership's name must contain the words "Registered Limited Liability Partnership" or the abbreviation "L.L.P." as the last words or letters of its name.
- **General Partnership:** A general partner may or may not invest, participates in running the partnership and is liable for all acts and debts of the partnership and any member of it. A General Partnership does not have limited partners. For a General Partnership, there is no registration with the state or even written agreement necessary for a general partnership to be formed. The legal definition of a partnership is generally stated as "an association of two or more persons to carry on as co-owners a business for profit" (Revised Uniform Partnership Act § 101 [1994]).
- **Joint Venture:** A joint venture is but another name for a special partnership. It might be distinguished from a general partnership in that the latter is formed for the transaction of a general business, while a joint venture is usually limited to a single transaction. That is, a joint venture is a special combination of persons in the nature of a partnership engaged in the joint prosecution of a particular transaction for mutual benefit or profit.

### Corporation

A customer meets all of these conditions:

- is a legally incorporated entity under the laws of any state or country
- is recognized as a corporation by the Texas Secretary of State
- has proper operating authority to operate in Texas.
- The corporation's 'legal name' as filed with the Texas Secretary of State must be provided as applicant. An 'assumed' name of a corporation is not recognized as the 'legal name' of the entity.

### Government

Federal, state, county, or city government (as appropriate)
The customer is either an agency of one of these levels of government or the
governmental body itself. The government agency's 'legal name' must be provided as the

applicant. A department name or other description of the organization should not be included as a part of the 'legal name' as applicant.

### **Trust or Estate**

A trust and an estate are fiduciary relationships governing the trustee/executor with respect to the trust/estate property.

### **Other Government**

A utility district, water district, tribal government, college district, council of governments, or river authority. Write in the specific type of government.

### e) Independent Entity

Check No if this customer is a subsidiary, part of a larger company, or is a governmental entity. Otherwise, check Yes.

### f) Number of Employees

Check one box to show the number of employees for this customer's entire company, at all locations. This is not necessarily the number of employees at the site named in the application.

### g) Customer Business Tax and Filing Numbers

These are required for Corporations and Limited Partnerships. These are not required for Individuals, Government, and Sole Proprietors.

### **State Franchise Tax ID Number**

Corporations and limited liability companies that operate in Texas are issued a franchise tax identification number. If this customer is a corporation or limited liability company, enter this number here.

### **Federal Tax ID**

All businesses, except for some small sole proprietors, individuals, or general partnerships should have a federal taxpayer identification number (TIN). Enter this number here. Use no prefixes, dashes, or hyphens. Sole proprietors, individuals, or general partnerships do not need to provide a federal tax ID.

### **TX SOS Charter (filing) Number**

Corporations and Limited Partnerships required to register with the Texas Secretary of State are issued a charter or filing number. You may obtain further information by calling SOS at 512/463-5555.

### **DUNS Number**

Most businesses have a DUNS (Data Universal Numbering System) number issued by Dun and Bradstreet Corp. If this customer has one, enter it here.

### 2. APPLICATION CONTACT

Provide the name, title and communication information of the person that TCEQ can contact for additional information regarding this application.

### 3. REGULATED ENTITY (RE) INFORMATION ON PROJECT OR SITE

### a) Regulated Entity Reference Number (RN)

A number issued by TCEQ's Central Registry to sites (a location where a regulated activity occurs) regulated by TCEQ. This is not a permit number, registration number, or license number. If this regulated entity has not been assigned an RN, leave this space blank.

If the site of your business is part of a larger business site, a Regulated Entity Number (RN) may already be assigned for the larger site. Use the RN assigned for the larger site. Search TCEQ's Central Registry to see if the larger site may already be registered as a regulated site at: <a href="http://www.tceq.texas.gov/goto/cr-searchrn">http://www.tceq.texas.gov/goto/cr-searchrn</a>

If the site is found, provide the assigned Regulated Entity Reference Number (RN) and provide the information for the site to be authorized through this application. The site information for this authorization may vary from the larger site information.

An example is a chemical plant where a unit is owned or operated by a separate corporation that is accessible by the same physical address of your unit or facility. Other examples include industrial parks identified by one common address but different corporations have control of defined areas within the site. In both cases, an RN would be assigned for the physical address location and the permitted sites would be identified separately under the same RN.

### b) Site/Project Name/Regulated Entity

Provide the name of the site as known by the public in the area where the site is located. The name you provide on this application will be used in the TCEQ Central Registry as the Regulated Entity name.

### c) Description of Activity Regulated

In your own words, briefly describe the primary business that you are doing that requires this authorization. Do not repeat the SIC Code description.

### d) County

Identify the county or counties in which the regulated entity is located.

### e) Latitude and Longitude

Enter the latitude and longitude of the site in degrees, minutes, and seconds or decimal form. For help obtaining the latitude and longitude, go to: http://www.tceq.texas.gov/gis/sqmaview.html or http://nationalmap.gov/ustopo

### f) Site/Project (RE) Physical Address/Location Information

Enter the complete address for the site in Section A if the address can be validated through the US Postal Service. If the physical address is not recognized as a USPS delivery address, you may need to validate the address with your local police (911 service) or through an online map site used to locate a site. Please confirm this to be a complete and valid address. Do not use a rural route or post office box for a site location.

If a site does not have an address that includes a street (or house) number and street name, enter NO ADDRESS for the street name in Section A. In Section B provide a complete written location description. For example: "The site is located 2 miles west from intersection of Hwy 290 & IH35, located on the southwest corner of the Hwy 290 South bound lane." Provide the city (or nearest city) and zip code of the facility location.

### 4. GENERAL CHARACTERISTICS

### a) Indian Country Lands

If your site is located on Indian Country Lands, the TCEQ does not have authority to process your application. You must obtain authorization through EPA, Region 6, Dallas. Do not submit this form to TCEQ.

### b) Construction activity associated with facility associated with exploration, development, or production of oil, gas, or geothermal resources

If your activity is associated with oil and gas exploration, development, or production, you may be under jurisdiction of the Railroad Commission of Texas and may need to obtain authorization from EPA Region 6. For more information, see:

 $\frac{\text{http://texreg.sos.state.tx.us/public/readtac\$ext.TacPage?sl=R\&app=9\&p dir=\&p rloc=\&p tloc=\&p ploc=\&pg=1\&p tac=\&ti=16\&pt=1\&ch=3\&rl=30}{\text{toc}}$ 

Construction activities associated with a facility related to oil, gas or geothermal resources may include the construction of a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel.

Where required by federal law, discharges of stormwater associated with construction activities under the Railroad Commission's jurisdiction must be authorized by the EPA and the Railroad Commission of Texas, as applicable. Activities under Railroad Commission of Texas jurisdiction include construction of a facility that, when completed, would be associated with the exploration, development, or production of oil or gas or geothermal resources, such as a well site; treatment or storage facility; underground hydrocarbon or natural gas storage facility; reclamation plant; gas processing facility; compressor station; terminal facility where crude oil is stored prior to refining and at which refined products are stored solely for use at the facility; a carbon dioxide geologic storage facility under the jurisdiction of the Railroad Commission of Texas; and a gathering, transmission, or distribution pipeline that will transport crude oil or natural gas, including natural gas liquids, prior to refining of such oil or the use of the natural gas in any manufacturing process or as a residential or industrial fuel. The Railroad Commission of Texas also has jurisdiction over stormwater from land disturbance associated with a site survey that is conducted prior to construction of a facility that would be regulated by the Railroad Commission of Texas. Under 33 U.S.C. §1342(1)(2) and §1362(24), EPA cannot require a permit for discharges of stormwater from "field activities or operations associated with {oil and gas} exploration, production, processing, or treatment operations, or transmission facilities, including activities necessary to prepare a site for drilling and for the movement and placement of drilling equipment, whether or not such field activities or operations may be considered to be construction activities" unless the discharge is contaminated by contact with any overburden, raw material, intermediate product, finished product, byproduct, or waste product located on the site of the facility. Under §3.8 of this title (relating to Water Protection), the Railroad Commission of Texas prohibits operators from causing or allowing pollution of surface or subsurface water. Operators are encouraged to implement and maintain best management practices (BMPs) to minimize discharges of pollutants, including sediment, in stormwater during construction activities to help ensure protection of surface water quality during storm events.

### c) Primary Standard Industrial Classification (SIC) Code

Provide the SIC Code that best describes the construction activity being conducted at this site.

Common SIC Codes related to construction activities include:

- 1521 Construction of Single Family Homes
- 1522 Construction of Residential Bldgs. Other than Single Family Homes
- 1541 Construction of Industrial Bldgs. and Warehouses

- 1542 Construction of Non-residential Bldgs, other than Industrial Bldgs. and Warehouses
- 1611 Highway and Street Construction, except Highway Construction
- 1622 Bridge, Tunnel, and Elevated Highway Construction
- 1623 Water, Sewer, Pipeline and Communications, and Power Line Construction

For help with SIC Codes, go to:

http://www.osha.gov/pls/imis/sicsearch.html

### d) Secondary SIC Code

Secondary SIC Code(s) may be provided. Leave blank if not applicable. For help with SIC Codes, go to: <a href="http://www.osha.gov/pls/imis/sicsearch.html">http://www.osha.gov/pls/imis/sicsearch.html</a>

### e) Total Number of Acres Disturbed

Provide the approximate number of acres that the construction site will disturb. Construction activities that disturb less than one acre, unless they are part of a larger common plan that disturbs more than one acre, do not require permit coverage. Construction activities that disturb between one and five acres, unless they are part of a common plan that disturbs more than five acres, do not require submission of an NOI. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

If you have any questions about this item, please contact the stormwater technical staff by phone at (512)239-4671 or by email at swgp@tceq.texas.gov.

### f) Common Plan of Development

Construction activities that disturb less than five acres do not require submission of an NOI unless they are part of a common plan of development or for sale where the area disturbed is five or more acres. Therefore, the estimated area of land disturbed should not be less than five, unless the project is part of a larger common plan that disturbs five or more acres. Disturbed means any clearing, grading, excavating, or other similar activities.

For more information on "What is a common plan of development?" go to: <a href="https://www.tceq.texas.gov/permitting/stormwater/common plan of development steps.html">www.tceq.texas.gov/permitting/stormwater/common plan of development steps.html</a>

For further information, go to the TCEQ stormwater construction webpage at: <a href="https://www.tceq.texas.gov/goto/construction">www.tceq.texas.gov/goto/construction</a> and search for "Additional Guidance and Quick Links". If you have any further questions about this item, please call the stormwater technical staff at (512)239-4671.

### g) Identify the water body(s) receiving stormwater runoff

The stormwater may be discharged directly to a receiving stream or through a MS4 from your site. It eventually reaches a receiving water body such as a local stream or lake, possibly via a drainage ditch. You must provide the name of the water body that receives the discharge from the site (a local stream or lake).

If your site has more than one outfall you need to include the name of the first water body for each outfall, if they are different.

### h) Identify the segment number(s) of the classified water body(s)

Identify the classified segment number(s) receiving a discharge directly or indirectly. Go to the following link to find the segment number of the classified water body where stormwater will flow from the site: <a href="www.tceq.texas.gov/waterquality/monitoring/viewer.html">www.tceq.texas.gov/waterquality/monitoring/viewer.html</a>

You may also find the segment number in TCEQ publication GI-316: <a href="https://www.tceq.texas.gov/publications/gi/gi-316">www.tceq.texas.gov/publications/gi/gi-316</a>

If the discharge is into an unclassified receiving water and then crosses state lines prior to entering a classified segment, select the appropriate watershed:

- 0100 (Canadian River Basin)
- o2oo (Red River Basin)
- 0300 (Sulfur River Basin)
- 0400 (Cypress Creek Basin)
- 0500 (Sabine River Basin)

Call the Water Quality Assessments section at (512)239-4671 for further assistance.

### i) Discharge into MS4 - Identify the MS4 Operator

The discharge may initially be into a municipal separate storm sewer system (MS4). If the stormwater discharge is into an MS4, provide the name of the entity that operates the MS4 where the stormwater discharges. An MS4 operator is often a city, town, county, or utility district, but possibly can be another form of government. Please note that the Construction General Permit requires the Operator to supply the MS4 with a copy of the NOI submitted to TCEQ. For assistance, you may call the technical staff at (512)239-4671.

### j) Surface Water bodies on list of impaired waters – Identify the impaired water body(s)

Indicate Yes or No if any surface water bodies receiving discharges from the construction site are on the latest EPA-approved CWA 303(d) List of impaired waters. Provide the name(s) of surface water bodies receiving discharges or potential discharges from the construction site that are on the latest EPA-approved CWA 303(d) List of impaired waters. The EPA-approved CWA 303(d) List of impaired waters in Texas can be found at:

www.tceq.texas.gov/waterquality/assessment/305\_303.html

NOTE: Do not use any "draft" documents.

### k) Discharges to the Edwards Aquifer Recharge Zone and Certification

See maps on the TCEQ website to determine if the site is located within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer at: <a href="https://www.tceq.texas.gov/field/eapp/viewer.html">www.tceq.texas.gov/field/eapp/viewer.html</a>

If the discharge or potential discharge is within the Recharge Zone, Contributing Zone, or Contributing Zone within the Transition Zone of the Edwards Aquifer, a site specific authorization approved by the Executive Director under the Edwards Aquifer Protection Program (30 TAC Chapter 213) is required before construction can begin. The certification must be answered "Yes" for coverage under the Construction General Permit. The TCEQ approved plan must be readily available for TCEQ staff to review at the time that the NOI is submitted.

The general permit requires the approved Contributing Zone Plan or Water Pollution Abatement Plan to be included or referenced as a part of the Stormwater Pollution Prevention Plan.

For questions regarding the Edwards Aquifer Protection Program, contact the appropriate TCEQ Regional Office. For projects in Hays, Travis and Williamson Counties: Austin Regional Office, 12100 Park 35 Circle, Austin, TX 78753, 512-339-2929. For Projects in Bexar, Comal, Kinney, Medina and Uvalde Counties: TCEQ San Antonio Regional Office, 14250 Judson Rd., San Antonio, TX 78233-4480, 210-490-3096.

### 5. CERTIFICATIONS

Failure to indicate **Yes** to ALL of the certification items may result in denial of coverage under the general permit.

### a) Certification of Understanding the Terms and Conditions of Construction General Permit (TXR150000)

Provisional coverage under the Construction General Permit (TXR150000) begins 7 days after the completed paper NOI is postmarked for delivery to the TCEQ. (Electronic applications submitted through ePermits have immediate provisional coverage). You must obtain a copy and read the Construction General Permit before submitting your application. You may view and print the Construction General Permit for which you are seeking coverage at the TCEQ web site: <a href="https://www.tceq.texas.gov/goto/construction">www.tceq.texas.gov/goto/construction</a>

### b) Certification of Legal Name

The full legal name of the applicant as authorized to do business in Texas is required. The name must be provided exactly as filed with the Texas Secretary of State (SOS), or on other legal documents forming the entity, that is filed in the county where doing business. You may contact the SOS at (512)463 5555, for more information related to filing in Texas.

### c) Understanding of Notice of Termination

A permittee shall terminate coverage under this Construction General Permit through the submittal of a NOT when the operator of the facility changes, final stabilization has been reached, the discharge becomes authorized under an individual permit, or the construction activity never began at this site.

### d) Certification of Stormwater Pollution Prevention Plan

The SWP3 identifies the areas and activities that could produce contaminated runoff at your site and then tells how you will ensure that this contamination is mitigated. For example, in describing your mitigation measures, your site's plan might identify the devices that collect and filter stormwater, tell how those devices are to be maintained, and tell how frequently that maintenance is to be carried out. You must develop this plan in accordance with the TCEQ general permit requirements. This plan must be developed and implemented before you complete this NOI. The SWP3 must be available for a TCEQ investigator to review on request.

### **Operator Certification:**

The certification must bear an original signature of a person meeting the signatory requirements specified under 30 Texas Administrative Code (TAC) §305.44.

### IF YOU ARE A CORPORATION:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(1) (see below). According to this code provision, any corporate representative may sign an NOI or similar form so long as the authority to sign such a document has been delegated to that person in accordance with corporate procedures. By signing the NOI or similar form, you are certifying that such authority has been delegated to you. The TCEQ may request documentation evidencing such authority.

### IF YOU ARE A MUNICIPALITY OR OTHER GOVERNMENT ENTITY:

The regulation that controls who may sign an NOI or similar form is 30 Texas Administrative Code §305.44(a)(3) (see below). According to this code provision, only a ranking elected official or principal executive officer may sign an NOI or similar form. Persons such as the City Mayor or County Commissioner will be considered ranking elected officials. In order to identify the principal executive officer of your government entity, it may be beneficial to consult your city charter, county or city ordinances, or the Texas statute(s) under which your government entity was formed. An NOI or similar document that is signed by a government official who is not a ranking elected official or principal executive officer does not conform to §305.44(a)(3). The signatory requirement may not be delegated to a government representative other than those identified in the regulation. By signing the NOI or similar form, you are certifying that you are either a ranking elected official or principal executive officer as required by the administrative code. Documentation demonstrating your position as a ranking elected official or principal executive officer may be requested by the TCEQ.

If you have any questions or need additional information concerning the signatory requirements discussed above, please contact the Texas Commission on Environmental Quality's Environmental Law Division at (512)239-0600.

### **30 Texas Administrative Code**

### §305.44. Signatories to Applications

- (a) All applications shall be signed as follows.
- (1) For a corporation, the application shall be signed by a responsible corporate officer. For purposes of this paragraph, a responsible corporate officer means a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures. Corporate procedures governing authority to sign permit or post-closure order applications may provide for assignment or delegation to applicable corporate positions rather than to specific individuals.
- (2) For a partnership or sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively.
- (3) For a municipality, state, federal, or other public agency, the application shall be signed by either a principal executive officer or a ranking elected official. For purposes of this paragraph, a principal executive officer of a federal agency includes the chief executive officer of the agency, or a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., regional administrator of the EPA).

### Texas Commission on Environmental Quality General Permit Payment Submittal Form

### Use this form to submit your Application Fee only if you are mailing your payment.

- Complete items 1 through 5 below:
- Staple your check in the space provided at the bottom of this document.
- Do not mail this form with your NOI form.
- Do not mail this form to the same address as your NOI.

### Mail this form and your check to:

### BY REGULAR U.S. MAIL

Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 P.O. Box 13088 Austin, TX 78711-3088

### BY OVERNIGHT/EXPRESS MAIL

Texas Commission on Environmental Quality Financial Administration Division Cashier's Office, MC-214 12100 Park 35 Circle Austin, TX 78753

	Fee Code: GPA	General Permit:	TXR150000
1.	Check / Money Order Number:		
2.	Amount of Check/Money Order:		
3.	Date of Check or Money Order:		
4.	Name on Check or Money Order:		
5.	NOI INFORMATION		
	If the check is for more than one NOI, list each Address exactly as provided on the NOI. DO THIS FORM AS IT COULD CAUSE DUPLICATION.	NOT SUBMIT A COPY OF TH	
	See Attached List of Sites (If more space is ne	eded, you may attach a list.)	
	Project/Site (RE) Name:		
	Project/Site (RE) Physical Address:		
	Staple Check i	n Thic Space	

### Appendix D & E – Copy of Inspection Form and Corrective Action Form

COA Grid N 27 & N 28 & P 27 30.301615 to -97.715226 Austin Texas, 78754

### AWU SPRINGDALE / 290 WATER LINE IMPROVEMENTS Appendix D and E - Inspection Form and Corrective Action Form

**Inspection Report** 

Prevention	р 92 2	Corrective A	ction Required
Pollution	Inspected in Compliance	Description	Data
Measure	Ins	Description (use additional sheet if necessary	Date y) Completed
	(Y/N)		,,
BEST MANAGEMENT PRACTICES			<u> </u>
Silt fences			
Rock berms			
Drain inlet protection			
Gravel filter bags			
Vehicle exits (offsite tracking)			
Concrete washout pit (leaks, failure)			
Temporary vegetation			
Permanent vegetation			
Sediment control basin			
Other structural controls			
Material storage areas (leakage)			
Equipment areas (leaks, spills)			
Construction debris			
General site cleanliness			
Trash receptacles			
Natural vegetation buffer strips			
EVIDENCE OF EROSION			
Site preparation			
Roadway or Parking Lot Construction			
Utility Construction			
Drainage Construction			
Building Construction			
MAJOR OBSERVATIONS			
Sediment discharges from site			
BMPs requiring maintenance			
BMPs requiring modification			
Additional BMPs required			
"I certify under penalty of law that this document and all attached qualified personnel properly gather and evaluate the information responsible for gathering the information, the information submissignificant penalties for submitting false information, including the submitting false information."	n submitted. itted is, to the	Based on my inquiry of the person or persons whe best of my knowledge and belief, true, accurate	no manage the system, or those persons directly e, and complete. I am aware that there are
Inspector's Name (Superintendent)		Inspector's Signature	Date
Name of Owner/Operator (Firm)	_	Authorized Signature	Date

Note: If there is a "NO" answer in the second column, the right columns will need to be completed and action is required within 7 days. Use additional sheets if necessary.

### Appendix F - SWPPP Amendment Log

### Instructions (see CGP Part 7.4):

- Create a log here of changes and updates to the SWPPP. You may use the table below to track these modifications.
- SWPPP modifications are required pursuant to CGP Part 7.4.1 in the following circumstances:
  - ✓ Whenever new operators become active in construction activities on your site, or
    you make changes to your construction plans, stormwater controls, or other
    activities at your site that are no longer accurately reflected in your SWPPP;
  - ✓ To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - ✓ If inspections or investigations determine that SWPPP modifications are necessary for compliance with this permit;
  - ✓ Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet requirements of the permit; and
- To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater control measures implemented at the site.
- If applicable, if a change in chemical treatment systems or chemically-enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]
		INSERT DATE	

### Appendix G – Subcontractor Certifications/Agreements

### SUBCONTRACTOR CERTIFICATION STORMWATER POLLUTION PREVENTION PLAN

Project Number:	
Project Title:	
Operator(s):	
As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Pl (SWPPP) for any work that you perform on-site. Any person or group who violates any conc of the SWPPP may be subject to substantial penalties or loss of contract. You are encourage advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.	dition ged to
Each subcontractor engaged in activities at the construction site that could impact stormw must be identified and sign the following certification statement:	vater
I certify under the penalty of law that I have read and understand the terms and conditions the SWPPP for the above designated project and agree to follow the practices described in SWPPP.	
This certification is hereby signed in reference to the above named project:	
Company:	
Address:	
Telephone Number:	
Type of construction service to be provided:	
Signature:	
Title:	
Date:	

### Appendix H – Grading and Stabilization Activities Log

Date Grading Activity Initiated	Description of Grading Activity	Description of Stabilization Measure and Location	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures Initiated
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	
INSERT DATE			INSERT DATE	INSERT DATE
			☐ Temporary	
			☐ Permanent	

### Appendix I – SWPPP Training Log

### Stormwater Pollution Prevention Training Log

Proje	ect Name:		
Proje	ect Location:		
Instru	uctor's Name(s):		
Instru	uctor's Title(s):		
Cours	e Location:		Date:
Cours	e Length (hours):		<u> </u>
Storm	water Training Topic: (check as appropr	ıte)	
	Sediment and Erosion Controls Stabilization Controls Pollution Prevention Measures		ency Procedures ctions/Corrective Actions
Speci	fic Trainina Obiective:		
	fic Training Objective:  dee Roster: (attach additional pages as		
Atten		necessary)	ompany
Atten No.	dee Roster: (attach additional pages as	necessary)	
No. 1 2 3	dee Roster: (attach additional pages as	necessary)	
No. 1 2 3 4	dee Roster: (attach additional pages as	necessary)	
No. 1 2 3 4 5	dee Roster: (attach additional pages as	ecessary)	
No. 1 2 3 4	dee Roster: (attach additional pages as  Name of Attendee	ecessary)	

### Appendix J – Delegation of Authority Form

Delegation	of Au	thority
------------	-------	---------

	,
othorized representative for the ements, including the Constructi construction site	the person or specifically described position purpose of overseeing compliance with ion General Permit (CGP), at the e. The designee is authorized to sign any I other documents required by the permit.
(nai (coi (ad (city	mpany) dress) y, state, zip)
	requirements to make such a designation designee above meets the definition of a ndix I.
n in accordance with a system devaluated the information subge the system, or those persons nation submitted is, to the best dete. I have no personal knowled and complete. I am aware that	all attachments were prepared under my designed to assure that qualified personnel bmitted. Based on my inquiry of the person directly responsible for gathering the of my knowledge and belief, true, dge that the information submitted is other there are significant penalties for of fine and imprisonment for knowing
	thorized representative for the ments, including the Construction site construction plans and all construction plans and construction plans and the construction construction plans are the construction of

### Appendix K – Endangered Species Documentation

No critical habitats are located within the approximate site boundary.

# IPac Information for Planning and Consultation U.S. Fish & Wildlife Service

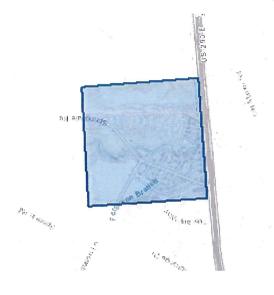
# IPaC resource list

outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of However, determining the likelihood and extent of effects a project may have on trust resources typically requires expected to be on or near the project area referenced below. The list may also include trust resources that occur This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or proposed activities) information.

jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Below is a summary of the project information you provided and contact information for the USFWS office(s) with Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

### Location

Travis County, Texas



# Local office

Austin Ecological Services Field Office

**(** (512) 490-0057

10711 Burnet Road, Suite 200 Austin, TX 78758-4460

http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ http://www.fws.gov/southwest/es/AustinTexas/

# **Endangered species**

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether species list which fulfills this requirement can only be obtained by requesting an official species list from either the project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and any species which is listed or proposed to be listed may be present in the area of such proposed action" for any Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

- 1. Draw the project location and click CONTINUE.
- 2. Click DEFINE PROJECT.
- 3. Log in (if directed to do so).
- Provide a name and description for your project.
   Click REQUEST SPECIES LIST.

### Listed species

<sup>1</sup> are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are

candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

### Birds

NAME

Black-capped Vireo vireo atricapilla

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5716

Golden-cheeked Warbler (=wood) Dendroica chrysoparia

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/33

Least Tern Sterna antillarum

This species only needs to be considered if the following condition applies:

Wind Energy Projects

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/8505

Piping Plover Charadrius melodus

This species only needs to be considered if the following condition applies:

**Threatened** 

Wind Energy Projects

There is final critical habitat for this species. Your location is outside the critical habitat.

https://ecos.fws.gov/ecp/species/6039

**Endangered** 

STATUS

**Endangered** 

Endangered

**Red Knot** Calidris canutus rufa

This species only needs to be considered if the following condition applies:

**Threatened** 

Wind Energy Projects

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1864

Whooping Crane Grus americana

There is final critical habitat for this species. Your location is outside the critical

habitat.

https://ecos.fws.gov/ecp/species/758

**Amphibians** 

IAME

Austin Blind Salamander Eurycea waterlooensis

There is final critical habitat for this species. Your location is outside the critical

habitat.

https://ecos.fws.gov/ecp/species/5737

Barton Springs Salamander Eurycea sosorum

No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/1113

Jollyville Plateau Salamander Eurycea tonkawae

There is final critical habitat for this species. Your location is outside the critical

habitat.

https://ecos.fws.gov/ecp/species/3116

Endangered

STATUS

Endangered

Endangered

Threatened

### Clams

NAME

Golden Orb Quadrula aurea

No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9042

Smooth Pimpleback Quadrula houstonensis

No critical habitat has been designated for this species.

<a href="https://ecos.fws.gov/ecp/species/8967">https://ecos.fws.gov/ecp/species/8967</a>

Texas Fatmucket Lampsilis bracteata

No critical habitat has been designated for this species.

<a href="https://ecos.fws.gov/ecp/species/9041">https://ecos.fws.gov/ecp/species/9041</a>

Texas Fawnsfoot Truncilla macrodon

No critical habitat has been designated for this species.

<a href="https://ecos.fws.gov/ecp/species/8965">https://ecos.fws.gov/ecp/species/8965</a>

Texas Pimpleback Quadrula petrina

No critical habitat has been designated for this species.

<a href="https://ecos.fws.gov/ecp/species/8966">https://ecos.fws.gov/ecp/species/8966</a>

STATUS

Candidate

Candidate

Candidate

Candidate

Candidate

### Insects

NAME

Kretschmarr Cave Mold Beetle Texamaurops reddelli No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3140

Tooth Cave Ground Beetle Rhadine persephone No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/5625

## Arachnids

VAME

Bee Creek Cave Harvestman Texella reddelli No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2464 Bone Cave Harvestman Texella reyesi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5306 Tooth Cave Pseudoscorpion Tartarocreagris texana No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/6667

STATUS

Endangered

Endangered

STATUS

Endangered

Endangered

Endangered

Tooth Cave Spider Neoleptoneta myopica
No critical habitat has been designated for this species.

https://ecos.fws.gov/ecp/species/2360

Endangered

# Flowering Plants

VAME

Bracted Twistflower Streptanthus bracteatus

No critical habitat has been designated for this species.

<a href="https://ecos.fws.gov/ecp/species/2856">https://ecos.fws.gov/ecp/species/2856</a>

STATUS

Candidate

# Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

- 1. The Migratory Birds Treaty Act of 1918.
- 2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <a href="http://www.fws.gov/birds/management/managed-species/">http://www.fws.gov/birds/management/managed-species/</a> birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds <a href="http://www.fws.gov/birds/management/project-">http://www.fws.gov/birds/management/project-</a> <u>assessment-tools-and-guidance/</u> conservation-measures.php
- http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf Nationwide conservation measures for birds

occur within your project area over a certain timeframe) and the <u>E-bird Explore Data Tool</u> (perform a query to see a list mapping tool (search for the name of a bird on your list to see specific locations where that bird has been reported to birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this The birds listed below are birds of particular concern either because they occur on the <u>USFWS Birds of Conservation</u> <u>Concern</u> (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for location, nor a guarantee that every bird on this list will be found in your project area. To see maps of where birders Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are and the general public have sighted birds in and around your project area, visit E-bird tools such as the E-bird data of all birds sighted in your county or region and within a certain timeframe). For projects that occur off the Atlantic available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list can be found below. For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area. BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

**Breeds elsewhere** 

This is a Bird of Conservation Concern (BCC) throughout its range in the

continental USA and Alaska.

American Golden-plover Pluvialis dominica

Breeds Sep 1 to Jul 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626 Bald Eagle Haliaeetus leucocephalus

Buff-breasted Sandpiper Calidris subruficollis
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/9488

Harris's Sparrow Zonotrichia querula This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

**Breeds elsewhere** 

esser Yellowlegs Tringa flavipes	This is a Bird of Conservation Concern (BCC) throughout its range in the	continental USA and Alaska.
Lesser Yell	This is a	continer

https://ecos.fws.gov/ecp/species/9679

Long-billed Curlew Numenius americanus
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/5511

Marbled Godwit Limosa fedoa
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/9481

Mountain Plover Charadrius montanus
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/3638

Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Breeds elsewhere** 

**Breeds elsewhere** 

**Breeds elsewhere** 

**Breeds elsewhere** 

Breeds May 10 to Sep 10

**Breeds elsewhere** 

Sprague's Pipit Anthus spragueii This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/8964

Breeds elsewhere

Swallow-tailed Kite Elanoides forficatus
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

https://ecos.fws.gov/ecp/species/8938

Breeds Mar 10 to Jun 30

Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

**Breeds elsewhere** 

## Probability of Presence Summary

project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts The graphs below provide our best understanding of when birds of concern are most likely to be present in your to birds.

## Probability of Presence (

presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species Each green bar represents the bird's relative probability of presence in your project's counties during a particular have higher confidence in the presence score if the corresponding survey effort is also high

How is the probability of presence score calculated? The calculation is done in three steps:

species was detected divided by the total number of survey events for that week. For example, if in week 12 there 1. The probability of presence for each week is calculated as the number of survey events in the week where the

were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

- imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence 2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
  - The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score. ന്

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

## Breeding Season (-)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

### Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

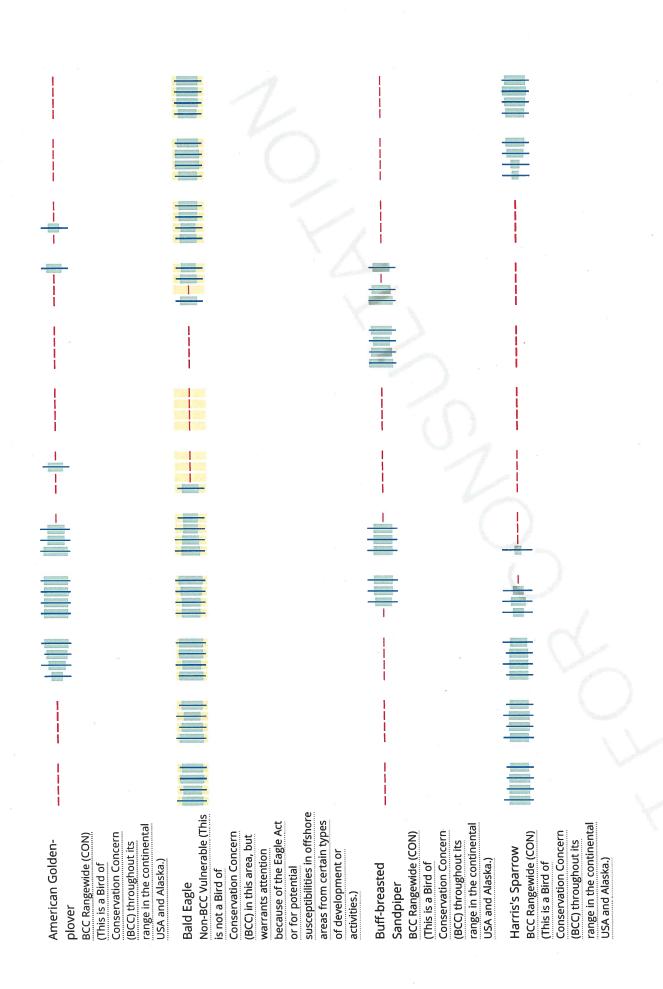
### No Data (-)

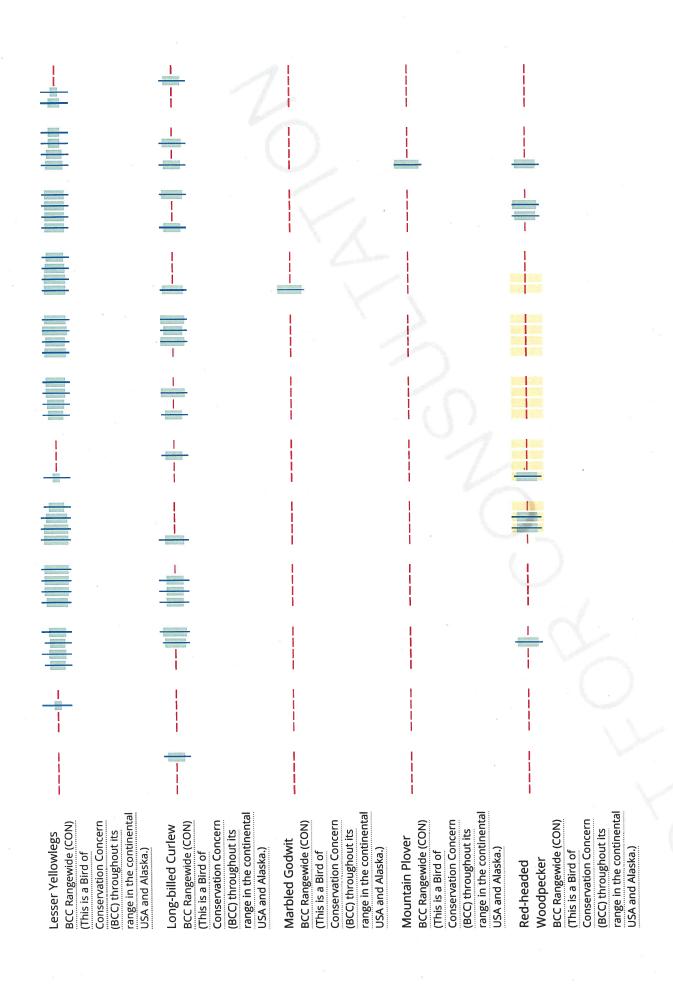
A week is marked as having no data if there were no survey events for that week.

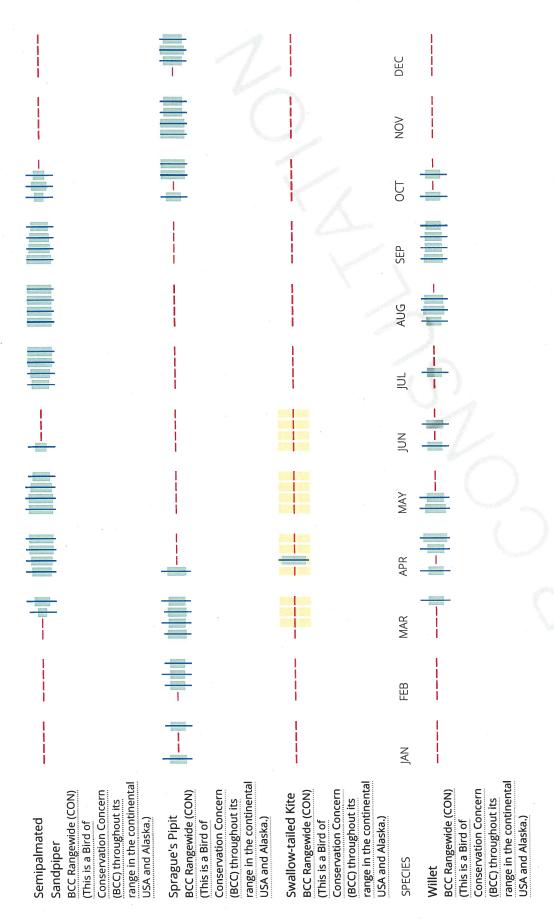
## **Survey Timeframe**

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.

– no data	DEC
survey effort	NON.
_	D0
reeding season	SEP
q	AUG
of presence	JUL
bability	NO
pro	MAY
	APR
	MAR
	FEB
	JAN
	ECIES







Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds <u>Nationwide Conservation Measures</u> describes measures that can help avoid and minimize impacts to all birds at any location year may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. <u>Additional measures</u> and/or <u>permits</u> may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

# What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS <u>Birds of Conservation Concern (BCC)</u> and other species that may warrant special attention in your project location. The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is because they are a BCC species in that area, an eagle (<u>Eagle Act</u> requirements may apply), or a species that has a particular vulnerability based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention to offshore activities or development.

birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all

## What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge <u>Network (AKN)</u>. This data is derived from a growing collection of <u>survey, banding, and citizen science datasets</u> Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may elsewhere" is indicated, then the bird likely does not breed in your project area.

## What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

- 1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
  - 2. "BCC BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
    - requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or 3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the <u>Eagle Act</u> activities (e.g. offshore energy development or longline fishing).

measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation

## Details about birds that are potentially affected by offshore projects

your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within underlying the portal maps through the <u>NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird</u> Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

## What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the BGEPA should such impacts occur.

## Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

FRESHWATER POND

PUBHh

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and the date of the source imagery used and any mapping problems. Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner affect such activities.

### Appendix L – Historic Properties Documentation

No historic properties are shown within the overestimated and approximate site boundary.

HOME

ATLAS MAP

ADVANCED SEARCH

- National Register District

TEXAS HISTORICAL COMMISSION real places telling real stories

### Appendix M - Rainfall Gauge Recording

Use the table below to record the rainfall gauge readings at the beginning and end of each work day. An example table follows.

Month/Year		Month/Year		Month/Year				
Day	Start time	End time	Day	Start time	End time	Day	Start time	End time
1			1			1		
2			2			2		
3			3			3		
4			4			4		
5			5			5		
6			6			6		
7			7			7		
8			8			8		
9			9			9		
10			10			10		
11			11			11		
12			12			12		
13			13			13		
14			14			14		
15			15			15		
16			16			16		
17			17			17		
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20			20			20		
21			21			21		
22			22			22		
23			23			23		
24			24			24		
25			25			25		
26			26			26		
27			27			27		
28			28			28		
29			29			29		
30			30			30		
31			31			31		

### Example Rainfall Gauge Recording

April 2017			May 2017			June 2017		
Day	7:00 am	4:400 pm	Day	7:00 am	4:00 pm	Day	7:00 am	4:00 pm
1			1	0.2	0	1	0	0.4
2			2	0	0	2	0	0
3	0	0	3	0.1	0.3	3		
4	0	0.3	4	0	0	4		
5	0	0	5	0	0	5	0	0

In this example (for only partial months), 0.25-inch rainfall inspections would have been conducted on April 4 and June 1.

### PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

Documents related to this section will include the construction drawings and general provisions of the Contract, including the General Conditions, Section 00700, Supplemental General Conditions, Section 00810, and other Division 1 requirements.

### 1.2 SUMMARY

- A. This section describes the preconstruction conference and other Project related meetings which may be held on a routine schedule throughout the duration of the Project.
- B. The CONTRACTOR, or his authorized representative(s), shall attend all Project related meetings as indicated herein. The CONTRACTOR's representatives, as a minimum, shall include his Project Manager and Superintendent. Other CONTRACTOR's representatives may attend Project related meetings; however, there shall be a maximum of four (4) CONTRACTOR's representatives at any one meeting unless the ENGINEER/ARCHITECT approves a larger number.
- C. The CONTRACTOR shall provide all pertinent reports, copies of reports, etc., for each meeting as may be required by this or other sections of the Contract.

### 1.3 PARTNERING WORKSHOP

- A. To complete this work most beneficially for all parties, the Owner desires to form a Partnering Team among the Owner, Engineer/Architect, Contractor, and Subcontractor(s). This relationship will draw on the strength of all parties to identify and achieve mutual goals. The objectives are effective and efficient contract performance, intended to achieve completion within budget, on schedule, and in accordance with the drawings and specifications.
- B. The Owner will schedule a Partnering Workshop independent of or in conjunction with the Preconstruction Conference, to facilitate the project objectives. The partnering relationship will be multilateral in makeup and participation will be totally voluntary.

### 1.4 PRECONSTRUCTION CONFERENCE

### A. Attendees

A preconstruction conference shall be held as soon after the award and execution of the Contract as possible and before any Work at the site is started. The conference will be held at a location selected by the Owner's Project Manager. The Owner's Project Manager shall prepare and distribute the meeting agenda, preside over the conference, and may distribute meeting minutes. The conference shall be attended by:

- 1. CONTRACTOR's Project Manager.
- 2. CONTRACTOR's Superintendent.
- 3. Any Subcontractors' and/or Suppliers' representatives whom the CONTRACTOR may desire to invite or whom the ENGINEER/ARCHITECT or OWNER may request to attend.
- 4. ENGINEER/ARCHITECT's representative.
- 5. OWNER's Project Manager.
- 6. OWNER'S REPRESENTATIVE
- 7. OWNER's Sponsor Department Representative.

- 8. Representative from the City of Austin, Transportation Department if a traffic management plan is required.
- 9. Representative from the City of Austin, Watershed Protection and Development Review Department, Environmental Inspection Division, if site erosion / sedimentation controls are required.
- 10. Representative from the City of Austin, Transportation Department if utility coordination has occurred through the Austin Utility Location and Coordination Committee.
- 11. Representative from the City of Austin, Contract Management Department, Contract Administration Division, to discuss wage.
- 12. Representative from the City of Austin, Small and Minority Business Resources Department to discuss M/WBE compliance.

### B. Meeting topics

The topics to be discussed may include, but will not be limited to, the following items:

- 1. Introduction of persons attending the meeting.
- 2. General project description, including length of contract and liquidated damages.
- 3. Key personnel associated with the construction (may include, but is not limited to the following):
  - CONTRACTOR's Project Manager
  - CONTRACTOR's Superintendent
  - OWNER's Project Manager
  - ENGINEER/ARCHITECT's representative
  - OWNER's Sponsor Department Representative.
  - · Representatives of the various utilities.
- 4. Lines of communication and chains of command.
- 5. Wage and personnel records and reporting requirements.
- 6. Subcontractors and suppliers.
- 7. Submittal review and approval procedure. Submittals may include, but are not limited to the following:
  - Letter stating the name and qualifications of the CONTRACTOR's Superintendent
  - Letter(s) from the Subcontractor(s) listing their salaried specialists
  - If applicable, a letter designating the Registered Professional Land Surveyor
  - If applicable, a letter designating the Safety Representative (for general project safety) and the "Competent Person" for excavation safety
  - Excavation Safety Systems Plan
  - Schedule of Values
  - Schedule for submittals
  - Shop drawings
  - Construction schedule (The schedule shall indicate the phases of work in which subcontractors will be participating. Subcontractors shall be indicated by name.)
  - Payroll reports
  - Substitution of subcontractors
  - · Non-use of asbestos materials affidavit
  - Appropriate safety training certificates for workers that will initially be on site

- Documentation for all workers initially on site who are governed by a prevailing wage classification as described in Section 00830.
- Construction Equipment Emissions Reduction Plan
- 8. Job and traffic safety.
- 9. Permits.
- 10. Utility coordination report.
- 11. Notification of property owners and other affected by the project
- 12. Job meetings.
- 13. Use of the site for construction, storage, staging, etc., and interrelationship with other contracts.
- 14. Equal opportunity requirements.
- 15. Laboratory testing of material requirements.
- 16. Inventory of materials stored on site provisions.
- 17. Progress estimate and payment procedure.
- 18. Posting of signs.
- 19. Project safety.
- 20. Prompt payment procedure.
- 21. Review of contract addenda, supplementary general conditions, special provisions, special specifications, and other unique project items.
- 22. Other

### 1.5 JOB MEETINGS

### A. General

Job meetings shall be held as deemed necessary by the ENGINEER/ARCHITECT or OWNER or as requested by the CONTRACTOR throughout the duration of the Project. The meetings shall be held at a location selected by or approved by the Owner's Representative. The OWNER's REPRESENTATIVE or CONTRACTOR, as agreed to, shall preside over the meeting and issue meeting minutes.

### B. Attendees

Job meetings will be attended by the following:

- 1. CONTRACTOR's Project Manager, when requested to attend.
- 2. CONTRACTOR's Construction Superintendent.
- 3. Any subcontractors' and/or suppliers' representatives whom the CONTRACTOR may desire to invite or whom the ENGINEER/ARCHITECT or OWNER requests to attend.
- 4. OWNER'S REPRESENTATIVE
- 5. ENGINEER/ARCHITECT's representative(s), if needed or required.
- 6. OWNER's PROJECT MANAGER, if needed or required
- 7. OWNER's Sponsor Department representative(s), if needed or required.

### C. Meeting topics

The topics will include, but not necessarily be limited to, the following subjects:

- Review of previous meetings' notes and update of pertinent information and Project status.
- 2. Identification and discussion of new job related construction problems. Such discussion will be toward resolving identified problems.
- 3. Review work accomplished to date and establish proposed construction activities for the upcoming week(s).
- 4. Discuss the status of or need for change orders.
- 5. Check of required bonds and insurance certificates (including Workers' Compensation Insurance verification for CONTRACTOR's, Subcontractor's, and Sub-Subcontractor's employees as stated in Section 00700, General Conditions, 5.2 Workers' Compensation).
- 6. Status of pay requests.
- 7. Work in progress.
- 8. Review and update construction schedule.
- 9. Review of submittals schedule and status of submittals.
- 10. Status of SMBR Compliance Plan.
- 11. Status of Safety Training certificates for all new workers on project.
- 12. Other.

### 1.6 OTHER MEETINGS

Other meetings shall be held from time to time as may be requested by the CONTRACTOR, the ENGINEER/ARCHITECT, or the OWNER. The time and place of the meetings shall be as mutually agreed upon. The attendance at the meetings shall be as requested by the party requesting the meeting.

### **END**

### **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS:

The Contractor prepares submittals. Drawings and general provisions of Contract, including Section 00700, "General Conditions"; Section 00810, "Supplemental General Conditions"; Division 1 requirements and City of Austin Technical Specifications and Special Provisions thereto, should be used as the related documents for this requirement.

### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
  - 1. Security plan.
  - 2. Contractor's construction schedule.
  - 3. Submittal schedule.
  - 4. Shop drawings.
  - 5. Product data.
  - 6. Samples.
  - 7. Quality assurance and quality control submittals, including calculations, mix designs and substantiating test results.
- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
  - 1. Permits.
  - 2. Applications for Payment.
  - 3. Performance and Payment bonds.
  - 4. Insurance certificates.
  - 5. Monthly Subcontractors expense report.
  - 6. Non-use of asbestos affidavits
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section 00700, "General Conditions"; Section 00810, "Supplemental General Conditions"; and/or Division 1, Section 01025, "Measurement and Payment" specifies requirements for submittal of the Schedule of Values.
  - 2. Division 1, Section 01200, "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
  - 3. Section 00700, "General Conditions"; Section 00810, "Supplemental General Conditions"; and/or Division 1, Section 01700, "Contract Close-out" specifies requirements for submittal of Project Record Documents and warranties at project close-out.
  - 4. Section 00700, "General Conditions" Article 6.2.4 specifies requirements for Substitutes and "Approved Equal" Items.
  - D. Technical Submittals: Technical information required to be submitted by the Standard Specifications, Special Provisions or Special Specifications.

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### PART 2 - PRODUCTS - not used

### **PART 3 - EXECUTION**

### 3.1 SUBMITTAL PROCEDURES

Contractor shall be responsible for the following:

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals or resubmittals concurrently.
    - a. The E/A reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
  - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
    - a. Allow fourteen (14) calendar days for initial review. Allow additional time if the Engineer must delay processing to permit coordination with subsequent submittals.
    - b. If an intermediate submittal is necessary, process the same as the initial submittal.
    - c. Allow fourteen (14) calendar days for processing each resubmittal.
    - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the E/A sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
  - 1. Provide a space approximately 4 inches by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
  - 2. Include the following information on the label for processing and recording action taken.
    - a. Project name.
    - b. Date.
    - c. Name and address of the Contractor's Engineer.
    - d. Name and address of the Contractor.
    - e. Name and address of the subcontractor.
    - f. Name and address of the supplier.
    - g. Name of the manufacturer.
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.

### C. Number of Copies:

1. Two (2) copies of the proposed Construction schedule and subsequent revision are required.

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- 2. Two (2) copies of the proposed Submittal schedule and subsequent revision are required.
- 3. Nine (9) copies of Shop Drawings, Product, Product Samples, Quality Assurance and Quality Control submittals are required.
- D. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the E/A through the Owner's Representative using a transmittal form (An example Transmittal Form is provided at the end of this section). The E/A will not accept submittals received from sources other than the Contractor.
  - 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
  - Number transmittals in sequence for each Series of the Specifications thus: x-xxx. The number after the dash indicates the Section of the Specifications, and the number before the dash is the sequence number of the transmittal. For example, the first item submitted related to Specification Item No. 506, "Manholes" would be labeled 1-506, the second item submitted would be labeled 2-506, etc. If the submittal item relates to a Special Provision or Special Specification, use SP506 or SS5061, for example, to indicate the applicable Specification Section. Identify resubmittals with a letter of the alphabet following the original sequence number, using "A" for the first resubmittal, "B" for the second resubmittal, etc. For example, the first resubmittal of the second item submitted for Specification SP506 would be labeled 2A-SP506.

### 3.2 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Construction Schedule: As described in Section 2.4.2 of Section 00700 "General Conditions", prepare a fully developed Contractor's construction schedule ("Baseline Schedule") using Microsoft Project<sup>©</sup> software unless otherwise approved by Owner's Representative. Submit Baseline Schedule prior to or at the preconstruction conference, and submit updated schedules as specified by the E/A, usually at each regularly scheduled Project Meeting and with each pay application.
  - 1. Detail each significant construction activity and use a weekly timeframe for the schedule. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
  - 2. With each update, revise task completion percentage and mark completed tasks.
  - 3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
  - 4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the critical path items and the sequences necessary for completion of related portions of the Work.
  - 5. Indicate the phases of work in which subcontractors will be participating. Subcontractors shall be indicated by name.
  - 6. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.

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- 7. Indicate substantial completion in advance of the date established for Final Completion to allow time for the E/A's procedures necessary for certification of Substantial and Final Completion.
- B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
- C. Cost Correlation: Within the Baseline Schedule, provide cost information indicating planned and actual costs. On the appropriate task line(s), show dollar volume of Work performed as of the dates used for preparation of applications for payment. Refer to Section 00700, "General Conditions", Article 14 Payment to Contractor and Completion for cost reporting and payment procedures.
- D. Distribution: Following response to the Baseline Schedule submittal, distribute electronic copies to the E/A, subcontractors, suppliers, and other parties required to comply with scheduled dates. Keep a copy at the Project Site at all times.
  - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- E. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made and as requested by the E/A. Issue the updated schedule concurrently with the report of each meeting, or as requested by the E/A.

### 3.3 SUBMITTAL SCHEDULE

- A. Concurrently with the development of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the initial Submittal Schedule along with the Construction Schedule, at, or prior to, the Pre-construction Conference.
  - 1. Coordinate Submittal Schedule with the list of subcontractors, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
  - 2. Prepare the schedule in chronological order. Provide the following information:
    - a. Scheduled date for the first submittal.
    - b. Related Section number or Specification number.
    - c. Submittal category (Shop Drawings, Product Data, Calculations, Test Results, or Samples).
    - d. Name of the subcontractor.
    - e. Description of the part of the Work covered.
    - f. Scheduled date for resubmittal.
    - g. Scheduled date for completion of the E/A's review.
- B. Contractor's schedule of submittals will be reviewed to verify that the list of submittals provided is all inclusive and the schedule is reasonable and realistic for delivery of the project. Owner will provide a response to the Contractor based on the assessment of the schedule of submittals.
- C. Distribution: Upon Owner's agreement with the schedule of submittals, print and distribute copies to the Owner's Representative, E/A, Owner, subcontractors, suppliers, and other parties required to comply with submittal dates indicated. Keep copies at the Project Site at all times.
  - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- D. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting, or as requested by the E/A.

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### 3.4 CONSTRUCTION SEQUENCE PLANS

The Contractor is required to submit construction sequence plans to the City at, or prior to, the pre-construction conference for approval. The Project shall be divided into phases according to the sequence of construction given in the Drawings and traffic control plans. The Contractor shall arrange his/her work schedule to complete all Work on each phase, including street repair, any valve casting or manhole adjustments, and street overlay before moving on to the next work area.

### 3.5 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, circle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
  - 1. Dimensions;
  - 2. Identification of products and materials included by sheet and detail number;
  - 3. Compliance with specified standards;
  - 4. Notation of coordination requirements; and
  - 5. Notation of dimensions established by field measurement.
  - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 inches by 11 inches but no larger than 24 inches by 36 inches.
  - 7. Do not use Shop Drawings without an appropriate stamp indicating action taken.

### 3.6 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, applicable certifications and performance curves.
  - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
    - a. Manufacturer's printed recommendations;
    - b. Compliance with trade association standards;
    - c. Compliance with recognized testing agency standards;
    - d. Application of testing agency labels and seals;
    - e. Notation of dimensions verified by field measurement; and
    - f. Notation of coordination requirements.
  - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
  - 3. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
    - a. Do not proceed with installation until a copy of the final submission of Product Data is in the Installer's possession.
    - b. Do not permit use of unmarked copies of Product Data in connection with construction.
  - 4. Potable Water, Reclaimed Water, and Wastewater Items or Projects: The Contractor shall submit descriptive information and evidence that the materials and equipment

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the Contractor proposes for incorporation into the Work is of the kind and quality that satisfies the specified functions and quality. **Austin Water Utility Standard Products Lists (SPL)** are a part of the Specifications. Contractors shall use products specified in the Contract Documents, listed on the SPLs, or approved by AWU through the process in Section 2.4.0 of the Utilities Criteria Manual. Products contained in the SPL cannot be substituted for items shown on the Drawings, or called for in the specifications, unless approved by the E/A in conjunction with the Austin Water Utility Standards Committee. **Unless otherwise specified,** products current at the time of solicitation shall be installed except where an updated List has been issued to remove a product because of quality or performance issues.

### 3.7 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished when specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  - 1. Mount or display Samples in the manner to facilitate review of qualities indicated. Include the following:
    - a. Specification Section number and reference;
    - b. Generic description of the Sample;
    - c. Sample source;
    - d. Product name or name of the manufacturer;
    - e. Compliance with recognized standards; and
    - f. Availability and delivery time.
  - 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
    - b. Refer to other Specification Sections for requirements of Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
    - c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
    - d. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
  - 3. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
    - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
    - b. Sample sets may be used by Owner for final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

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### 3.8 QUALITY ASSURANCE AND QUALITY CONTROL SUBMITTALS

- A. Submit quality assurance and quality control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, materials test results, field testing and inspection reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a certification from the manufacturer or responsible Engineer certifying compliance with specified requirements.
  - 1. Signature: Certification shall be signed by an officer of the corporation or other individual authorized to sign documents on behalf of the company.
- C. Calculations: When required in the technical specification, calculations shall be prepared and stamped by a Professional Engineer registered in the State of Texas.
- D. Concrete, Controlled Low Strength Material, Asphalt Stabilized Base and Hot Mix Asphaltic Concrete Mix Designs and Substantiating Test Data: Requirements for submittal of mix designs and substantiating test data are specified in the applicable Technical Specification Section. Each separate batch plant supplying ASB, HMAC and/or concrete shall submit mix designs to the Owner's Representative for review.

### 3.9 ENGINEER/ARCHITECT'S ACTION

- A. Except for submittals, for the record, or for information where action and return is not required, the E/A will review each submittal, mark to indicate action taken, and return within the time frame specified in Paragraph 3.1.A.3.
  - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The E/A will stamp each submittal with a uniform, action stamp. The E/A will mark the stamp appropriately to indicate the action taken, as follows:
  - 1. "Reviewed": the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  - 2. "Reviewed with Comments": the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  - 3. "Revise and Resubmit" or "Rejected": do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations and resubmit without delay. Repeat if necessary to obtain different action mark.
    - a. Do not use, or allow others to use, submittals marked "Revise and Resubmit" or "Rejected" at the Project Site or elsewhere where Work is in progress.
  - 4. Other Action: Where a submittal is for information, or for record purposes, or for special processing, or for other activity, the E/A will return the submittal marked "Record Copy", "Action Not Required" or "No Action Taken."
- C. Unsolicited Submittals: The E/A will return unsolicited submittals to the sender without action.

### 3.10 PREPARATION AND SUBMITTAL OF CONSTRUCTION RECORD DRAWINGS

The Owner's Representative and the Contractor's Superintendent will each maintain a set of bluelines noting any changes in ink during construction of the Project. The Owner's Representative and the Contractor's Superintendent will compare bluelines at least weekly (at a time mutually acceptable to

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both) to exchange information and compare notes to ensure all items installed and changes are documented. The following is a recommended minimum of items to be noted:

### **GENERAL**

- 1. Notes should be sufficiently clear to allow a draftsperson to easily make the necessary changes without the need for field checks and interpretation.
- 2. One complete set of Construction Record bluelines will be submitted prior to the final pay request and forwarded to the Owner.

### STREET RECONSTRUCTION AND OVERLAY PROJECTS

- 1. Location, type, and quantity of all work added or deleted from the Project including repair areas, milled areas, sidewalk, ramps, curb and gutter, etc.
- 2. Deviations in street, sidewalk, curb and gutter location and grades from Drawings.

### WATER/WASTEWATER PROJECTS

- 1. Type, name and model numbers of all valves (with # of turns to open/close), air release valves, drain and fire hydrants noted at locations installed.
- 2. Installed locations of all assignments, appurtenances and elevations which differ from those indicated on the Drawings.
- 3. Pipe manufacturer type and classification noted in sufficient detail to determine location and extent of each type or classification installed.
- 4. Modification to any standard or special details noted.
- 5. Location and description of pipe closures.
- 6. Thrust blocking locations and restrained pipe lengths, approximate dimensions and quantities noted.
- 7. Location, type and quantity of all addition and deletions.
- 8. Changes in grade.

The above list is not intended to be complete. Any information noted which could be used for future maintenance, location and construction projects is encouraged to be noted on the bluelines.

### 3.11 CONSTRUCTION DIARIES

The Contractor shall prepare a daily construction diary recording as a minimum the following information concerning events at the site and submit duplicate copies to the Owner's Representative at weekly intervals. The copies are to be signed by the project Superintendent as defined in Section 00700, Article 6.1.2.

- 1. Work performed;
- 2. Approximate count of Contractor's personnel, by classification, on the site;
- 3. List by classification, of all Subcontractors, personnel and any professionals on the site that day:
- 4. List of all equipment on the site by make and model;
- 5. High and low temperatures together with general weather conditions;
- 6. Start time and finish time of day's work;
- 7. Accidents and / or unusual events;
- 8. Meetings and significant decisions made;
- 9. Stoppages, delays, shortages and / or losses;
- 10. Meter readings and / or similar recordings;
- 11. Emergencies procedures that may have been needed;
- 12. Orders and requests of governing authorities;
- 13. Change Orders received and implemented;
- 14. Services connected and / or disconnected;
- 15. Installed equipment and / or system tests and / or startups and results;
- 16. Partial completions and / or occupancies; and
- 17. Date of substantial completion certified.

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### **Shop Drawing Transmittal**

Month XX, 2008

Transmittal No.	
Previous Transmittal No.	
Previous Submittal Date	

City of Austin Construction Inspection Division Public Works Department P.O. Box 1088 Austin, Texas 78767

Project Name: Austin Lakeside Drive

Attention: Owner's Representative

Enclosed are nine (9) copies of the following items for your review:

Item <u>No.</u>	<u>Description</u>	Submittal Type	Specification Section	Subcontractor/Supplier
1. 2.	6" DI Pipe 8" Resilient Seat	Produce Data	510	ABC Company
	Gate Valve	Product Data	511	DEF Company

NOTE: Item 1 above contains a deviation from the Specifications as indicated on the item

Submitted by:

XYZ Company 101 Ranch Road 2974 Austin, Texas 78759

**END** 

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### **Division 1 General Requirements** CONSTRUCTION EQUIPMENT EMISSIONS REDUCTION PLAN Section 01353

### 1. GENERAL

### 1.1. **RELATED DOCUMENTS**

**A.** This Section applies to Drawings and all provisions of Contract.

### 1.2. SUMMARY – CONSTRUCTION EQUIPMENT EMISSIONS PLAN

- A. The OWNER, as part of the Council Resolution No. 20100211-019, has decided to take steps to reduce emissions associated with construction process including Nitrogen Oxides (NOx), particulate matter and greenhouse gas. Construction activity is a source of large quantities of particulate matter and ozone forming Nitrogen Oxides that adversely affect the health of our community and the natural environment.
- **B.** The CONTRACTOR shall employ practices and take actions that reduce emissions from NOx, particulate matter (black soot) and greenhouse gases resulting from activities associated with new construction and demolition Projects.
- C. The CONTRACTOR shall maximize the use of equipment and vehicles with advanced emission controls in support of the City's goals, utilizing equipment that meets defined EPA emissions standards.

### 1.3. **DEFINITIONS**

- A. "Construction Equipment" means equipment powered by an internal combustion engine and used for performing or otherwise advancing the Work on the Project, other than motor vehicles intended for use on public highways and registered pursuant to Section 502.002 of the Texas Transportation Code.
- **B.** The list of applicable Construction Equipment includes, but is not limited to excavators, backhoes, loaders, bulldozers, graders, rock saws, generators, and other similar equipment.
- C. "EPA" means the United States Environmental Protection Agency.
- **D.** "Low-Use Equipment" means any piece of construction equipment which is used for less than ten (10) hours per week on site for a single construction contract.
- **E.** "Greenhouse Gases" are emissions that absorb and emit radiation within the atmosphere. Greenhouse Gases can be one or a combination of, these gases: carbon dioxide, methane, nitrous oxide and three groups of fluorinated gases (sulfur hexafluoride, hydro fluorocarbons, and perfluorocarbons)

### 1.4. **REQUIREMENTS - Not Used**

### 1.5. **SUBMITTALS**

### A. CONSTRUCTION EQUIPMENT EMISSIONS REDUCTION PLAN:

1. The CONTRACTOR agrees to prepare a draft Emissions Reduction Plan (referred to as PLAN) prior to start of construction. This PLAN shall include an inventory report containing identifying data for each piece of equipment to be used on the worksite and shall include the following:

- Vehicle/Equipment: Make & Model Year
- Vehicle/Equipment: Engine Make & Model Year
- Vehicle/Equipment: Fuel Type
- Vehicle/Equipment: Expected gallons or hours used for project duration
- a) The OWNER will provide Emissions Reduction Toolkit to help the CONTRACTOR in preparation of the PLAN and inventory.
- 2. The CONTRACTOR shall develop a list of strategies to be used in this Project in order to reduce emissions from NOx, particulate matter and greenhouse gas (CO<sub>2</sub> equivalent). Once prepared, the agreed upon strategies shall be incorporated into the PLAN. The PLAN will then be signed by the CONTRACTOR and made ready for implementation. Implementation progress will be reviewed once a month in regularly scheduled project progress meetings. The PLAN may be modified during construction if changes are made to the Project, but adjustments shall be approved by the OWNER prior to implementation.
- **3.** This PLAN may be used by the Owner's Representative or Inspector to conduct site inspections and/or verify compliance with specification elements.
- **4.** If additional equipment is brought on-site after construction begins, the Contractor shall provide this same inventory information to the Owner's Representative for the new equipment on or before the day it begins work on-site. All additional equipment shall conform to the PLAN.
- **5.** Reports shall be provided for all equipment used on-site.

### **B. EOUIPMENT EMISSIONS CLOSEOUT DOCUMENTATION:**

- **1.** Submit the following prior to final payment:
  - a) Record of changes made to the original PLAN and reasons.
  - b) Provide a summary and documentation of strategies used and estimated reductions in fuel & emissions.
  - c) Provide documentation of amount and % of alternative fuel used.

### 2. PRODUCTS

Not used

### 3. EXECUTION

### 3.1. GENERAL

**A.** Implement the submitted PLAN. Provide personnel, documentation, equipment, signage, transportation, and other items as required to implement the PLAN during the entire duration of the Contract.

### 3.2. EQUIPMENT EMISSIONS PLAN IMPLEMENTATION

**A.** Plan Coordinator (Could be same as superintendent): Designate an on-site person responsible for instructing workers on the Owner's intent to reduce emissions, overseeing implementation and documenting results of the PLAN for the Project.

- **B.** Plan Review: Review the PLAN in monthly progress meeting and include comments in the meeting notes.
- **C.** Instruction: Provide on-site instructions to all subcontractors of emissions reduction methods to be used by all parties for the appropriate activities of the Project.
- **D.** Discuss Owner's goals and requirements at the following meetings:
  - 1. Pre-bid conference.
  - 2. Pre-construction conference.
  - **3.** Progress meetings (monthly).

### 3.3 **EQUIPMENT EMISSIONS REDUCTION TOOLKIT**

- A. Equipment Emissions Reduction Toolkit available at:
  - 1. Website: (http://austintexas.gov/department/capital-improvement-program)
  - 2. City of Austin Public Works Department, Project Management Division, One Texas Center, Suite 900
  - **3.** Construction Job Site Office (after contract award)
- **B.** Equipment Emissions Reduction Toolkit consists of:
  - 1. A list of Construction Equipment Emissions Reduction Strategies
  - 2. EPA fuel savings calculator by idling reductions
  - **3.** Posting of Anti-idling signs
  - **4.** Memorandum of Agreement by Local Area Governments
  - **5.** Equipment Inventory Form

### A LIST OF EQUIPMENT EMISSIONS REDUCTION STRATEGIES 3.4

The following are suggested emissions reduction strategies and references. As per the specification section 01353, 1.5 Submittals, the CONTRACTOR shall develop a list of strategies to be used in this Project at the start of construction.

### C-1 Anti-Idling Strategies:

1. Implement and enforce anti-idling practices for all equipment and vehicles on and adjacent to the site and associated with the project. City will provide a construction site sign and stickers for vehicles and equipment. Add Hyperlink to COA Idling flyer location **TBD** 

Also refer to:

https://www.nctcog.org/trans/quality/air/for-everyone/engine-off-north-texas

Another potential resource for the COA website on emission specifications: https://www.tceq.texas.gov/airquality/mobilesource/vehicleidling.html

- **2.** Limit all idling of project associated vehicles and equipment operations to five (5) minutes unless the idling is applicable to one or more of the following exceptions:
  - a) Idling is being used for emergency response purposes;
  - b) Idling is necessary for component of mechanical operation, maintenance, or diagnostic purposes; or
  - c) Idling is for the health or safety of the equipment operator.
- **3.** Provide education to all staff, vendors and subcontractors about emissions hazards and anti-idling practices and encourage use of EPA calculator for fuel savings.
- **4.** To the extent possible, do not stop or idle haulage trucks directly under tree limbs and foliage overhanging the street along the haul route. Further avoid such damage from truck exhaust by means of exhaust diversion devices to redirect or diffuse exhaust from being directed in a concentrated manner to tree limbs and foliage.
- **5.** Avoid vehicle loitering or queuing outside or inside the gates of the work area to minimize degradation of localized air quality.

(http://austintexas.gov/airquality/)

### **C-2 Alternative Fuels:**

- **6.** Utilize **alternative fuels** including, Texas LED Compliant B20 (or higher) biodiesel, Compressed Natural Gas (CNG), propane and electric. (Refer to EPA Energy Policy Act for full list).
- **7.** Avoid unnecessary fuel use by providing on-site fuelling for alternate fuels.

(http://www.tceg.texas.gov/airquality/mobilesource/txled/cleandiesel.html)

(http://www.eere.energy.gov/cleancities)

(<a href="http://lonestarcfa.org">http://lonestarcfa.org</a>)

### **C-3 Vehicle/Equipment Improvements:**

- **8.** It is recommended that CONTRACTOR takes advantage of the **Texas Emission Reduction Plan (TERP)** grant incentives to upgrade (replace or repower) vehicles with retrofitted emission reduction technologies.

  (<a href="http://www.tceq.texas.gov/airquality/terp/index.html">http://www.tceq.texas.gov/airquality/terp/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/terp/index.html">www.tceq.texas.gov/airquality/terp/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/terp/index.html">www.tceq.texas.gov/airquality/terp/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/terp/index.html">www.tceq.texas.gov/airquality/tcep/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/tcep/index.html">www.tceq.texas.gov/airquality/tcep/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/tcep/index.html">http://www.tceq.texas.gov/airquality/tcep/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/tcep/index.html">www.tceq.texas.gov/airquality/tcep/index.html</a>) or (<a href="http://www.tceq.texas.gov/airquality/tce
- **9.** Utilize **battery powered and/or solar powered equipment** where available. This strategy can be combined with anti-idling strategies by using this technology for sign boards. (evtransportal.org/dieselengineidlereduction.pdf)
- **10.** Consider using voluntary and mandatory sections of the City of Chicago Clean Diesel Program related to <a href="https://www.chicago.gov/city/en/progs/env/clean-diesel.htmlfile:///C:/Users/user/Documents/Downloads/O2011-1418.pdf">https://www.chicago.gov/city/en/progs/env/clean-diesel.htmlfile:///C:/Users/user/Documents/Downloads/O2011-1418.pdf</a>
- **11.** Consider an air quality training section administered by a governmental entity to help comply with an updated

COA Construction Equipment Emission Reduction Plan by using the California Air Resources Board (CARB) training section in the link below:

https://ww2.arb.ca.gov/our-work/topics/construction-earthmoving-equipment

### **C-4 Maintenance Program:**

- **1.** Establish a preventative **maintenance program** addressing issues including but not limited to, fuel use, air emissions, tire pressure, smoke from exhaust and noise.
- 2. Make all efforts to **prevent oil/fuel spillage** on to site surfaces.

### **C-5 Resource Management:**

- 3. Utilize equipment companies that are located closest to the construction site.
- **4.** Store equipment on site during construction use or arrange for closest overnight storage including **temporary use of the Right of Way** if possible.
- **5.** To the extent possible, CONTRACTOR shall maximize use of **local and regional materials** to reduce transportation emissions.
- **6.** CONTRACTOR shall maximize **salvage and reuse** of appropriate on-site materials. (<a href="http://www.usgbc.org/ShowFile.aspx?DocumentID=1095">http://www.usgbc.org/ShowFile.aspx?DocumentID=1095</a>)
- **7.** To the greatest extent possible, stage equipment and vehicles away from, and minimize operation near, sensitive receptors including, but not limited to, operable windows, fresh air intakes, hospitals, schools, licensed day care facilities, residences and areas where people congregate.

**END** 

### Division 1 General Requirements CONSTRUCTION PHOTOGRAPHY & VIDEOS Section 01380

### 1. GENERAL

CONTRACTOR shall be responsible for the production of pre-construction, construction progress and post-construction photographs as provided herein. Owner's Representative may also designate additional subjects for photographs in addition to the general guidelines identified below.

### 2. QUALITY

All photographs must be produced by a competent photographer and shall be digital (6 Mega-Pixel) date-stamped color photography of commercial quality. All CONTRACTOR-generated photographs must be stored in a .jpeg file format. Each photograph shall be submitted in duplicate as two 3x5 prints with no more than 3 photos per page of professional quality enclosed in clear plastic sleeve within 3 tab folders. The prints shall be accompanied by digital date-stamped photographs in CD format or another format acceptable to the City. Each print shall be marked with the name and CIP ID number for the Contract, name of CONTRACTOR, description and location of view and identity of photographer.

Each photograph submittal must include a Photo Log that includes the name and CIP ID number of Contract, name of CONTRACTOR, the name of the photographer and company, photograph number, the date of the photograph and the filename that the camera assigns to the photo (e.g. MVC-001.jpg). In addition, appropriate descriptive information to properly identify the location of view must be entered into the Photo Log that includes a project drawing or sketch to assist in maintaining a concise project record (e.g. location of MH 5 - Line A or Sta. 2+00 - Line A or location of Sedimentation Basin 5, sludge pump A).

### 3. VIEWS AND QUANTITIES

### 3.1. PRE-CONSTRUCTION VIDEO

STREET, RIGHTS-OF-WAY, OR WATER/WASTEWATER/STORMWATER PROJECTS

CONTRACTOR shall document by video, within the limits of construction, all pre-existing site conditions/elements as listed for the Pre-construction Photographs below. The video documentation shall provide a clear and continuous view of the project alignment showing all visible utilities and features within the limits of construction. The pre-construction video shall be in a format acceptable to the City and shall be shot prior to the occurrence of any site disturbance after Notice to Proceed. The pre-construction video shall be submitted within ten (10) calendar days of the Notice to Proceed.

### 3.2. PRE-CONSTRUCTION PHOTOGRAPHS

STREET, RIGHTS-OF-WAY, OR WATER/WASTEWATER/STORMWATER PROJECTS

All pre-construction photographs must be submitted within ten (10) calendar days of the Notice to Proceed. Pre-construction photographs must be taken at sufficient intervals to be able to carefully document the pre-construction conditions of the Work, but in no case less than 100 foot intervals along the street, right-of-way, drainage easement or water/wastewater line route before commencement of Work. Each photograph location

shall be taken from a minimum of two (2) views (one forward station view and one backward station view along the street, drainage, easement, or pipeline route) within the limits of construction. Particular attention must be devoted to pre-existing damage to structures; landscape features, streets, curbs, sidewalks, driveways, signs, mailboxes, retaining walls, MSE walls, etc. shall be documented. An identifier such as houses or businesses address/ signs, property numbers, mailboxes, landscaping, etc. shall be included in each view for ease of later identification. At a minimum, Preconstruction photographs must be taken of the following views:

- The entire street ROW
- The entire easement width and length (both permanent and temporary)
- All curb lines (both sides of street) all pre-existing curb damage not called for replacement within the Work and shall include major cracks
- All driveways, steps, and curbs and curb ramps (both sides of street)
- Fence and gate conditions
- Trees, ornamental shrubs, plantings/planter boxes and evidence of irrigation features
- Other privately or publically owned features or facilities that might be disturbed by the construction
- Prominent utility features, such as: guy wires, poles, signs, valves, fire hydrants, meters, pull boxes, etc.
- Streams and stream banks within the limits of construction
- Other significant or prominent features in order to protect the OWNER and CONTRACTOR following construction (e.g. close up photographs of pre-existing broken curbs, cracked/failed pavement, damaged adjacent retaining walls, etc.)
- Views of structures, both inside and adjacent to the ROW/easement in areas where CONTRACTOR will be working within five (5) feet of said structure
- Other views as requested by the OWNER

### 3.3. CONSTRUCTION PROGRESS PHOTOGRAPHS

STREET, RIGHTS-OF-WAY, OR WATER/WASTEWATER/STORMWATER PROJECTS

Construction Progress photos must be taken at least monthly showing the progress of the work for the month. Construction photographs of the same views taken during preconstruction photography must be taken during the progress of the Work and shall be submitted monthly with the Contractor's monthly progress payment application.

### 3.4. POST CONSTRUCTION PHOTOGRAPHS

Post-construction photographs must be taken of the same views taken during preconstruction photography to fully document the completed project. Post-construction photographs must be taken after cleanup and site restoration and must be submitted with the final payment.

End

### PART 1 - GENERAL

### 1.1 Related Documents:

Drawings and general provisions of Contract, including General Conditions, Section 00700, and Supplemental General Conditions, Section 00810, and Division 1 requirements.

### PART 2 - PRODUCTS (NOT USED)

### **PART 3 - EXECUTION**

### 3.1 Temporary Storage and Staging Areas

During the performance of this Contract, CONTRACTOR shall make all arrangements for, and maintain at its own expense, any necessary property or space for materials and equipment storage, warehouses, field trailers, or laydown yards as may be needed by CONTRACTOR to prosecute the Work. OWNER will not be responsible for any costs of obtaining, maintaining, or restoring any such private storage and staging areas that the CONTRACTOR may use. Construction materials, machinery, and trench spoils may not be stored within the rights-of-way. Should CONTRACTOR wish to make private arrangements for staging and storage at a location near or adjacent to the site of the Work, OWNER shall be notified in writing of such arrangements prior to start of site work, and OWNER will file application for proper amendment to the Site Plan Permit. All permit requirements for compliance with City watershed protection ordinances shall apply to CONTRACTOR'S staging and storage areas, the same as the other areas in the limits of construction for the project.

### 3.2 Water for Construction

All water required for and in connection with the Work to be performed shall be furnished by and at the expense of the CONTRACTOR through meters installed on hydrants, except for water used in the "disinfection of potable water lines" process per Specification 510.3(29). All water used in the disinfection process shall not be metered, but rather shall be measured by calculation. Such water use does not require a meter, but a double-check valve assembly is required when connecting to a fire hydrant or a City main. CONTRACTOR shall submit a written plan for the disinfection process for review and approval by OWNER prior to commencing Work. The written plan shall include the CONTRACTOR's plan for final flushing and discharge of chlorinated water, and shall specify the quantities of potable water that will be required for the procedure and dosage plan proposed by the CONTRACTOR. Water used in the disinfection process shall be supplied by the OWNER through hydrants or connection through a City main at no charge to the CONTRACTOR for the initial disinfection procedure up to the quantities agreed to in the written plan for the disinfection process. Should the initial disinfection procedure fail to produce acceptable bacteriological sample test results, the cost of water at standard rates used for subsequent disinfection procedures shall be the responsibility of the CONTRACTOR with quantities determined through calculations.

For all water required for and in connection with the Work to be performed other than for the disinfection process, water and meters will be available from OWNER at standard rates. All costs for obtaining a water meter shall be the responsibility of the CONTRACTOR. The CONTRACTOR shall contact the Austin Water Utility and arrange to pick up the meter. CONTRACTOR shall install a double-check valve assembly on the fire hydrant between the hydrant and the meter, to prevent backflow in the event of pressure failure. CONTRACTOR shall supply all necessary tools, hose and pipe, and shall make necessary arrangements for securing and transporting such water and shall take water in such a manner, and at such times, that will not produce a harmful drain or decrease of pressure in the OWNER's water system. It shall be the CONTRACTOR's responsibility to make arrangements with the Austin

Water Utility for the metering and reporting of the amount of water used. Water shall not be used in a wasteful manner. Standard hydrant wrenches shall be used for opening and closing of fire hydrants. In no case shall pipe wrenches be used for this purpose. Temporary lines shall be removed when no longer required.

"If applicable, after the installation of the City of Austin's water meter(s) for the Project, the CONTRACTOR has the option to utilize the water available from this service at the CONTRACTOR's expense. An adjustment to the Contract amount will be made by Change Order at the end of the Project for the costs incurred by the City of Austin for the water."

### 3.3 Telephone Service (NOT USED)

### 3.4 Sanitary Facilities

CONTRACTOR shall furnish temporary sanitary facilities at the site, as provided herein, for the needs of all construction workers and others performing Work or furnishing services on the Project.

Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet shall be furnished for each 20 employees. CONTRACTOR shall enforce the use of such sanitary facilities by all personnel at the site.

### 3.5 Protection of Public and Private Property

CONTRACTOR shall protect, shore, brace, support and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by the CONTRACTOR's operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, and medians, shall be restored to their original condition, whether within or outside the easement/right-of-way. All replacements shall be made with new materials.

CONTRACTOR shall be responsible for all damage to streets, roads, curbs, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, or other public or private property, which may be caused by transporting equipment, materials, or men to or from the Work, whether by him or his Subcontractors. CONTRACTOR shall make satisfactory and acceptable arrangements with the owner of, or the agency having jurisdiction over, the damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage.

All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

### 3.6 Tree and Plant Protection

All trees and other vegetation which must be removed to perform the Work shall be removed and disposed of by the CONTRACTOR; however, no trees or cultured plants shall be unnecessarily removed unless their removal is indicated on the Drawings. All trees and plants not removed shall be protected against injury from construction operations.

No tree shall be removed outside of permanent easement(s), except where authorized by the E/A. Whenever practicable, CONTRACTOR shall tunnel beneath trees in yards and parking lots when on or near the line of trenching operations. Hand excavations shall be employed as necessary to prevent injury to trees. Care shall be taken with exposed roots, unearthed during construction, so that roots do not dehydrate causing tree damage.

Trees considered by the E/A to have any significant effect on construction operations are indicated on the Drawings and those which are to be preserved are so indicated.

CONTRACTOR shall take extra measures to protect trees designated to be preserved, using methods shown on the Drawings and as specified in Standard Specification Item No. 610S "Preservation of Trees and other Vegetation".

# 3.7 Security

CONTRACTOR shall be responsible for protection of the site, and all Work, materials, equipment, and existing facilities hereon, against vandals and other unauthorized persons.

No claim shall be made against OWNER by reason of any act of an employee or trespasser, and CONTRACTOR shall make good all damage to the OWNER's property resulting from CONTRACTOR's failure to provide security measures as specified.

Security measures shall be at least equal to those usually provided by OWNER to protect existing facilities during normal operations, and shall also include such additional security fencing, barricades, lighting, and other measures as required to protect the site. When required, the CONTRACTOR shall provide a security plan to the OWNER for review as to appropriateness of the security measures proposed.

#### 3.8 Access Roads

CONTRACTOR shall establish and maintain temporary access roads to various parts of the site as required to complete the Project. Such roads shall be available for the use of all others performing Work or furnishing services in connection with the Project.

#### 3.9 Parking

CONTRACTOR shall provide and maintain suitable parking areas for the use of all construction workers and others performing Work or furnishing services in connection with the Project, as required, to avoid any need for parking personal vehicles where they may interfere with public traffic, the OWNER's operations, or construction activities.

#### 3.10 Dust Control

Dust Control during construction of this Project shall conform to Standard Specifications Item No. 220S, "Sprinkling for Dust Control". No direct payment will be made for dust control. Dust Control shall be considered subsidiary work relating to various Bid items of the Contract.

# 3.11 Temporary Drainage Provisions

CONTRACTOR shall be responsible for providing for the drainage of stormwater and such water as may be applied or discharged on the site in performance of the Work. CONTRACTOR shall obtain E/A approval for temporary drainage facilities which will handle, carry through, or divert around his Work all drainage flow, including storm flow and flows created by construction activity, to prevent silting of waterways or flooding damage to the property and adjacent property.

#### 3.12 Erosion Control

CONTRACTOR shall prevent erosion of soil on the site and adjacent property resulting from his construction activities. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operations which will disturb the natural protection.

CONTRACTOR shall use controls found in "Environmental Criteria Manual" or developed from successful techniques elsewhere as approved by E/A.

#### 3.13 Pollution Control

CONTRACTOR shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris and the substances resulting from construction activities. No sanitary wastes will be permitted to enter any drain or watercourse. No sediment, debris or other

substance will be permitted to enter sanitary sewers and reasonable measures shall be taken by CONTRACTOR to prevent such materials from entering any drain or watercourse.

CONTRACTOR shall observe the rules and regulations of the State of Texas and agencies of the U.S. Government prohibiting the pollution of any lake, stream, river, or wetland by the dumping of any refuse, rubbish, dredge material, or debris therein.

CONTRACTOR is specifically cautioned that disposal of materials into any water of the State must conform to the requirements of the Texas Commission on Environmental Quality (TCEQ), and any applicable permit from the U.S. Army Corps of Engineers.

#### 3.14 Noise Control

CONTRACTOR shall comply with the City of Austin's Noise Ordinance. CONTRACTOR shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound level in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work.

#### 3.15 CIP Sign

CONTRACTOR shall erect install and maintain CIP signs as specified. Signs shall be constructed in accordance with City Standard Specification Item No. 802S "Project Signs," as indicated on the Drawings.

#### 3.16 Fences

All existing fences affected by the Work shall be maintained by the CONTRACTOR until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across any construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

Upon completion of the Work across any tract of land, CONTRACTOR shall restore all fences to preconstruction, or to a better, condition and to their preconstruction location.

#### 3.17 Mail Boxes

CONTRACTOR shall remove, reset temporarily, and relocate permanently all mail boxes that are within construction site limits conforming to requirements of United States Postal Service. Mailboxes shall not be laid on the ground, but shall be temporarily reset the same day as removed. Payment for removing and resetting of mail boxes will not be paid for directly, but will be considered subsidiary to the various Bid items. Any damage to mail boxes or posts shall be the responsibility of the CONTRACTOR.

#### 3.18 Emergency Facilities

Free access shall be maintained at all times to fire lanes and emergency and utility control facilities such as fire hydrants, fire alarm boxes, police call boxes, and utility valves, manholes, junction boxes, etc. In the event that it is necessary to make one of these facilities temporarily inaccessible, CONTRACTOR shall obtain approval of such action and schedule of Work from the OWNER. CONTRACTOR shall also provide at least 24 hours prior notice to the Fire Department, Police Department, and City Department governing the affected utility. The same Department(s) shall be promptly notified by the CONTRACTOR when such facilities are placed back in unobstructed service.

#### 3.19 Notification of Owners

Unless otherwise indicated, the OWNER will notify property owners abutting the right-of-way of impending construction. The CONTRACTOR shall exercise diplomacy and tact with individual property owners.

#### 3.20 Maintenance of Traffic

CONTRACTOR shall conduct his Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks whether public or private, the CONTRACTOR shall provide and maintain suitable safe bridges, detours or other temporary measures to accommodate public and private travel, and shall provide reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when CONTRACTOR has obtained written permission from the owner and the tenant of the private property, or from the authority having jurisdiction over public property involved, to obstruct traffic at the designated point. A copy of the initial written permission shall be provided to the Owner's Representative.

Safety and conveyance of traffic shall be regarded as prime importance. Unless otherwise directed, all portions of streets associated with this Project shall be kept open and provided a dust free, smooth and comfortable ride to traffic. It shall be the responsibility of the CONTRACTOR to ensure that two-way traffic may safely bypass the construction site and that access is provided to abutting private property. In making open cut street crossings, the CONTRACTOR shall not block more than one-half of the street at one time without approval of the OWNER. Whenever possible, CONTRACTOR shall widen the shoulder on the opposite side to facilitate traffic control. Temporary surfacing shall be provided as necessary on shoulders.

Prior to beginning Work, CONTRACTOR shall designate, in writing, a competent person who will be responsible and available on the Project site, or in the immediate area, to ensure compliance with the traffic control plan. CONTRACTOR shall provide documentation to demonstrate the sufficient training in Traffic Control for his competent person. Owner will designate a qualified person to observe implementation and who will have authority to assure compliance with the traffic control plan.

The CONTRACTOR shall perform the necessary cleanup and finishing immediately after all or a portion of the Work is completed. When the Work includes paving operations, the entire site shall be kept clean to facilitate placement of required traffic control devices. Temporary and permanent striping lay-out shall be approved by the Transportation Department prior to placement, when included in the Work.

#### 1. Detours

Where indicated on the traffic control plan CONTRACTOR shall erect and maintain detours around construction activities. Should CONTRACTOR desire to propose a detour, not already included in the traffic control plan, it shall be his responsibility to prepare a revised traffic control plan showing the detour, and obtain approval of the revised traffic control plan from the Transportation Department, prior to implementation of the detour. The Transportation Department has final authority as to the acceptability of any proposed revisions to the traffic control plan. The CONTRACTOR shall bear all costs for revising the traffic control plan and for maintaining the proposed detour.

#### 2. Barricades and lights

CONTRACTOR shall place and maintain in good condition, standard barricades at each end of the Project and at other locations where traffic is rerouted or blocked from using regular traffic lanes. Barricades and warning signs shall be in accordance with the Texas Manual on Uniform Traffic Control Devices (MUTCD) and City of Austin Standard Specification Item No. 803S, "Barricades, Signs and Traffic Handling". Signs, barricades, and warning devices informing the public of construction features will be placed and maintained by the CONTRACTOR, who shall be solely responsible for their maintenance. The decision to use a

particular device at a particular location as indicated in the traffic control plan or as determined by the CONTRACTOR, shall be the sole responsibility of the CONTRACTOR.

All open trenches and other excavations shall have suitable barricades, signs, and lights to provide adequate protection to the public. Obstructions, such as material piles and equipment shall be provided with similar warning signs and lights.

All barricades and obstructions shall be illuminated with warning lights from sunset to sunrise. Material storage and conduct of the Work on, or along side, public streets and highways shall cause a minimum obstruction and inconvenience of the traveling public.

# 3.21 Required Job Site Postings and Notices

CONTRACTOR shall post the following postings and notices in English and Spanish at one or more conspicuous locations on the job site. In the case of Projects with multiple sites, the notices and postings must be displayed at each site. In the case of Projects that do not have a job shack or other temporary facility on the site, CONTRACTOR shall post all notices on a temporary bulletin board. Other special conditions are noted below.

Required for all Projects			
Poster	Available at:		
Baseline Schedule for Project identifying when all subcontractors will be used	N/A (as required under Section 00700, paragraph 2.4.2.1.)		
Wage Rates as required under Section 00830.	Section 00830BC and/or Section 008300HH		
City of Austin Wage Contact posters	Provided at Pre-Construction meeting (English and Spanish)		
City of Austin Equal Employment Opportunity posters	http://austintexas.gov/department/wage-compliance (English and Spanish)		
Texas Commission on Environmental Quality "Construction Site Notice" form, if applicable, as required or the required TPDES information	http://www.tceq.state.tx.us/assets/public/permitting/waterquality/attac hments/stormwater/txr152d2.pdf (Option 1 – as required under Section 00810, 6.7.4.2 N/A (Option 2 – as required under Section 00810, 2.6.7.4.3)		
OSHA poster "Job Safety and Health: It's the Law"	http://www.osha.gov/Publications/osha3165.pdf (English) http://www.osha.gov/Publications/osha3167.pdf (Spanish)		
City of Austin Rest Break Ordinance Signs	http://austintexas.gov/department/wage-compliance (English and Spanish) As required to be posted in English and Spanish under Ordinance No. 20100729-047		
Texas Payday Law Poster	http://www.twc.state.tx.us/ui/lablaw/ll10.pdf (English) http://www.twc.state.tx.us/ui/lablaw/ll10s.pdf (Spanish)		
Texas Workers Compensation notice that the employer does or does not carry Workers Compensation insurance	Does not carry Workers Compensation Insurance: http://www.tdi.state.tx.us/forms/dwc/notice5.pdf (English) http://www.tdi.state.tx.us/forms/dwc/notice5s.pdf (Spanish)  Does carry Workers Compensation Insurance: http://www.tdi.state.tx.us/forms/dwc/notice6.pdf (English) http://www.tdi.state.tx.us/forms/dwc/notice6s.pdf (Spanish)		
TWC Employer's	http://www.oiec.state.tx.us/documents/Employer Notice of O.pdf		

Notification of the	(both versions)
Ombudsman Program to	
Employees	
DOL – The Uniformed	http://www.dol.gov/vets/programs/userra/USERRA Private.pdf
Services Employment and	
Reemployment Rights Act	
(USERRA)	
EEOC Equal Employment	http://www.dol.gov/ofccp/regs/compliance/posters/pdf/eeopost.pdf
Act and the Americans	(English)
with Disabilities Act (ADA)	http://www.dol.gov/ofccp/regs/compliance/posters/pdf/eeosp.pdf
	(Spanish)
Fair Labor Standards Act	http://www.dol.gov/whd/regs/compliance/posters/flsa.htm (English)
(FLSA) Minimum Wage	http://www.dol.gov/whd/regs/compliance/posters/flsaspan.htm
Poster	(Spanish)
If applicable: Employee	http://www.dol.gov/whd/regs/compliance/posters/disabc.pdf
Rights for Workers with	http://www.dol.gov/whd/regs/compliance/posters/disabspanc3p.pdf
Disabilities/Special	
Minimum Wage Poster –	
Employment Standards "Your Rights Under the	http://www.dol.gov/whd/waga/sampliance/pastava/fmlaca.ndf (English)
Family and Medical Leave	http://www.dol.gov/whd/regs/compliance/posters/fmlaen.pdf (English) http://www.dol.gov/whd/regs/compliance/posters/fmlasp.pdf (Spanish)
Act (FLMA)"	<u>Inttp://www.doi.gov/whd/regs/compliance/posters/imlasp.pdr</u> (Spanish)
Title VI Rights Poster	http://austintexas.gov/department/wage-compliance
3	
Additional Postings Requ	ired for Federally Funded Projects
"Employee Rights Under	http://www.dol.gov/whd/regs/compliance/posters/fedprojc.pdf
the Davis-Bacon Act"	(English)
	http://www.dol.gov/whd/regs/compliance/posters/davispan.pdf
	(Spanish)
Applies to USDOT/FHWA	http://www.mdt.mt.gov/publications/docs/forms/dbe/eeo board/false s
funded projects:	<u>tatements.pdf</u>
"Notice of False	
Statements Concerning	(as required in Section 00810A Standard Federal-Aid Assurances)
Highway Projects"	
Applies to USDOT/FHWA	N/A (as required in Section 00810A Standard Federal-Aid Assurances)
funded projects;	
"Contractors EEO Policy"	

# **END**

# Division 1 General Requirements CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Section 01505

#### Non-Building Projects - Water/Wastewater and Street Reconstruction

#### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- 1. Division 01 Section 01200 "Project Meetings"
- 2. Division 01 Section 01500 "Temporary Facilities"
- 3. Division 01 Section 01901 "Scope of Work Asbestos Abatement"
- 4. Division 01 Section 01902 "Project Coordination Asbestos Abatement"
- 5. Division 01 Section 01904 "Codes and Regulations Asbestos Abatement"
- 6. Division 01 Section 01910 "Worker Protection Asbestos Abatement"
- 7. Division 01 Section 01911 "Respiratory Protection Asbestos Abatement"
- 8. Division 01 Section 01915 "Work Area Clearance Asbestos Abatement"
- 9. Division 01 Section 01917 "Disposal of Asbestos Containing Waste Materials".

#### 1.2 SUMMARY

- **A.** The Owner has established that the Project shall minimize the creation of construction and demolition waste on the Project site and shall recycle and/or salvage non-hazardous construction, demolition, and land clearing debris to divert waste from Landfills. See 1.5 Waste Management Goals.
  - 1. All profits resulting from salvaging and recycling shall go to the Contractor.
  - **2.** Where there is little cost difference between recycling/salvaging and landfilling of items, the Contractor is directed to recycle/salvage.
- **B.** Hazardous materials are an exception to this Section. Comply with applicable requirements of Local, State and Federal regulations.
- **C.** This Section includes administrative and procedural requirements for recycling, salvaging and disposing of non-hazardous demolition and construction waste

#### 1.3 REFERENCES

- **A.** The standards listed below form a part of this Section to extent referenced. Standards are referred to in the text by basic reference only.
  - 1. Sustainable Building Sourcebook Austin Energy Green Building: <a href="https://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/constructionWasteManagement.htm">www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/constructionWasteManagement.htm</a>
  - 2. Resource Exchange Network for Eliminating Waste (RENEW), TCEQ (MC-112), Biannual catalog lists materials available and wanted; serves Texas and surrounding states; lists are posted on the Internet: http://www.tceq.state.tx.us/assistance/P2Recycle/renew/renew.html
  - **3.** Recycle Texas Online, A service of the Texas Commission on Environmental Quality. Contains information on about 1000 businesses and local governments handling

materials from Texas. Organizations' information is self-reported, and listings are free of charge. www.tceq.state.tx.us/assistance/P2Recycle/rtol/rtol.html

#### 1.4 DEFINITIONS

- **A.** Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
- B. Clean: Untreated, unpainted, not contaminated with oils, solvents, caulk, or other materials.
- **C.** Disposal: Acceptance of solid wastes at legally permitted and operating facility for the purposes of landfilling.
- **D.** Diversion: Avoidance of demolition and construction waste sent for disposal to landfill or incineration. Diversion does not include using materials for landfill, alternate daily cover on landfills, or materials used as fuel in waste-to-energy processes.
- **E.** Hazardous Waste: Byproducts of society that can pose a substantial or potential hazard to human health or the environment when improperly managed and possessing at least 1 of 4 of the following characteristics or appearing on a special Environmental Protection Agency (EPA) list.
  - 1. Ignitability.
  - 2. Corrosivity.
  - **3.** Reactivity.
  - **4.** Toxicity.
- **F.** Landfill: Authorized land waste disposal site that is located to minimize waste pollution from runoff and leaching.
- **G.** Recycling: The process of sorting, cleansing, treating, and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- **H.** Return: To give back reusable items or unused products to vendors for credit.
- **I.** Reuse: A strategy to return materials to active use in the same or a related capacity.
- **J.** Salvage: To remove a waste material from the Project site to another site for resale or reuse by others.
- **K.** Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become a waste.
- L. Toxic: Poisonous to living beings either immediately or after a long period of exposure.
- M. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- **N.** Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes all materials removed from the Project site to be land-filled, recycled, or salvaged for reuse. Pallets, containers, packaging and packing materials in which construction products are delivered to the Project site are considered waste materials.

#### 1.5 WASTE MANAGEMENT GOALS

**A.** The Owner has established that as much as is economically feasible of the "waste" materials produced as a result of the Work, shall be employed, salvaged, reused, or recycled in order to minimize the impact of construction and demolition waste on landfills and reducing disposal costs.

- **B.** Contractor shall employ and encourage practices that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- **C.** Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, State, and local, pertaining to legal disposal of all construction waste materials.
- **D.** Contractor shall recycle and divert materials for secondary uses whenever economically feasible.
- **E.** Acceptable methods of diversion include:

Recycling, reuse, and salvage

Donation to nonprofit organizations

Removal from jobsite by staff or subcontractors for use (not disposal)

Return to supplier

Sale to organizations or individuals

**F.** The Contractor shall develop a Construction and Demolition Waste Management Plan of non-hazardous construction and demolition waste. The plan shall identify the materials to be diverted from disposal and define the materials to be separated on-site or off-site. Calculations can be done by weight or volume but must be consistent throughout.

#### 1.6 SUBMITTALS

**A.** Waste Management Plan: A Project-specific plan for the collection, transportation, and disposal of the waste generated at the construction site, shall be submitted for approval within 14 calendar days after notice to proceed, or prior to any waste removal, whichever occurs first. The approved Plan shall be distributed to all subcontractors and the owner and will not relieve the Contractor's responsibility for compliance with applicable environmental regulations.

An example template is included as "Appendix A" to this section.

- 1. The Waste Management Plan shall include the following:
  - a. Identify each type of waste material produced as a result of the Work on the Project Site.
  - b. Identify each type and quantity of demolished and waste material intended to be recycled, salvaged, or reused.
  - c. Identify material separation requirements.
  - e. Identify location of temporary on-Site storage for recycled and reused materials.
  - f. Identify final destination means of transportation for each recycled and reused material.
  - h. Identify the name/phone number of the Contractor's on-site coordinator of the Waste Management Plan.
  - i. Indicate permit or license and the location of the municipal solid waste landfills and other disposal area(s) to be used.
  - j. List of materials that cannot be recycled or reused.
- **B.** Construction Waste Management Closeout Documentation: Submit the following upon the completion of The Work and prior to final payment:

- a. A Summary of Solid Waste Disposal and Diversion (refer example template "Appendix B") prepared and maintained through Project duration, demonstrating that 100% of all non-hazardous construction wastes were recycled, salvaged or disposed of properly and includes as a minimum the following information:
  - 1. Dates
  - 2. Materials Description and Quantity
  - 3. Indicate whether recycled, salvaged, reused of sent to landfill for disposal.
  - 4. Destination or Name and location of accepting facility.
- b. Copies of all receipts, manifests, weight tickets, and other documentation that identify all materials recycled, salvaged, land-filled or incinerated.

#### **PART 2 - PRODUCTS**

Not used

#### **PART 3 - EXECUTION**

#### 3.1 GENERAL

- **A.** Implement the Waste Management Plan as approved by the City of Austin Project Manager. Provide handling, containers, storage, signage, transportation, and other items as required to implement Waste Management Plan during the entire duration of the Contract.
- **B.** Satisfy the requirements outlined in Subsection 1.5, Waste Management Goals.

#### 3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- **A.** Plan Coordinator: Designate an on-site party (or parties) responsible for instructing workers, overseeing implementation and documenting results of the Waste Management Plan for the Project.
- **B.** Plan Distribution: Provide copies of the Waste Management Plan to the Contractor's superintendent, each Subcontractor, the Owner, and the Engineer.
- **C.** Meetings: Include Construction Waste Management in progress meetings to maintain the Plan for achieving the owners waste management goals:
- **D.** Carefully order materials to avoid over supply.
- **E.** Protect materials from contamination during handling, storage and transport to meet the requirements of the accepting facilities.
- **F.** Assign and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, return and disposal. This area shall be kept neat and clean and clearly marked in order to avoid contamination of materials.

#### 3.3 RECYCLING REQUIREMENTS

- **A.** Materials: In general, the contractor is encouraged to recycle the following types of construction waste materials generated during the course of this project, that are not salvaged or reused:
  - a. Asphalt concrete pavement.
  - b. Concrete materials.
  - c. Metals, including the following.
    - i. Banding straps.

- ii. Reinforcing steel.
- iii. Iron.
- iv. Steel pipe.
- v. Galvanized steel pipe.
- d. Clean dimensional lumber.
- e. Wood crates and pallets.
- f. Glass and glass containers.
- q. Plastics.
- h. Electrical wiring.
- i. Cardboard, paper, and packaging.
- j. Beverage containers.
- **B.** Methods: The following recycling methods, or a combination of, may be used.
  - 1. On-site separation: Each material to be recycled shall be separated at the Project site and delivered to the recycling markets or directly from the Project site.
    - a. If on-site separation method is used, designate a specific area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.
    - b. Maintain recycling and waste bin areas neat and clean and clearly marked, both in Spanish and in English, in order to avoid co-mingling of materials.
    - c. Protect materials from contamination.
  - 2. Off-site separation: Materials to be recycled are delivered unsorted from the Project site to a materials recovery facility or transfer station where recyclable materials are separated from other waste.
    - a. Contractor shall verify that the entity responsible for the off-site separation has a market for all materials required to be recycled from the Project site.
    - b. The same Submittals procedures shall apply.
    - c. Protect materials from contamination.

#### 3.4 REUSE

- **A.** Contractor is encouraged to reuse as many demolished and waste materials as possible.
- **B.** Reuse of waste materials includes the following:
  - a. Salvaging materials scheduled for disposal.
  - b. Off-Site storage of waste materials for future reuse by Contractor on other projects.
  - c. Returning unused and reusable materials, packaging and pallets, to vendor.
  - e. Assemble designated reuse items in a single location safe from damage, for review and approval by the owner's representative.

#### 3.5 SALVAGE

- A. Salvage Guidelines:
  - 1. The contractor is encouraged to salvage as many items as deemed economically possible, considering reduction of land filling fees and possible use by others.

2.	Assemble potentially salvageable items in one area and donate or sell to the public after review by the City of Austin Project Manager.
3.	All proceeds from the sale of salvaged items shall go to the contractor.

# **Appendix A. Sample Construction Waste Management Plan**

# **Construction Waste Management Plan**

Project:	
Contracto	r:
Date:	
Contact:	
Phone:	
Prepared I	ov:

Diversion Goal: Recycle, reuse and/or salvage as much land-clearing and construction waste as is economically feasible.

### I. Coordination and Training

- a. Name of Contractor's representative responsible for CWM implementation & coordination.
- b. Describe method(s) of waste recycling management on-site and/or off-site.
- c. Describe how Contractor's staff and subcontractors will be informed regarding proper recycling and separation procedures
- d. Describe and/or show on an attached site map where the temporary waste material storage area(s) will be located, and how will contamination of separated waste materials will be prevented?

### II. Waste Minimization

a.	What waste minimization techniques will be employed during the construction phase?
b.	Which employees and / or subcontractors will be involved with each technique?

# III. Construction Waste Analysis (including site / land-clearing materials, as applicable)

a. **Diverted Materials**: For each material anticipated to be reused or recycled (diverted from the landfill), provide information to complete the table below. (Note: Whenever possible, attempt to use or donate construction waste materials rather than recycling.)

Material or Item	Storage Method (roll-off, bin, area, on pallet, etc.)	Quantity estimate (no., linear ft., square ft., etc.)	Proposed Recipient
Add rows (or naner na			

Add rows (or paper pages) as required

b. *Landfill*: For construction phase trash and materials / items that will not be diverted, complete the following table:

Quantity estimate (weight or volume)	Number and size of roll offs anticipated	Proposed landfill site

# Project name \_\_\_ **Project Number** Contractor Name License Number Contractor Address Solid Waste Recycled, Date Amount Municipal Recycling/Reuse Comment Material Reused, Material Disposed/ Solid Waste Facility (If disposed state salvaged or Disposed Diverted Facility Name Address why not diverted) disposed (Ton or cubic (Name, Phone diverted yd.) address, Phone) Vegetation Soil Trench spoils Rock Asphalt Concrete Metal Wood Debris Glass Trash Other Signature Date Page / of / total pages

Appendix B. Summary of Solid Waste Disposal and Diversion

# Division 1 General Requirements PUBLIC SAFETY AND CONVENIENCE

Section 01550

#### **PART 1 - GENERAL**

#### 1.1 Related Documents:

Drawings and general provisions of Contract, including General Conditions, Section 00700, and Supplemental General Conditions, Section 00810, and Division 1 requirements.

#### PART 2 - PRODUCTS (NOT USED)

#### **PART 3 - EXECUTION**

#### 3.1 General

CONTRACTOR shall maintain reasonable local vehicular and pedestrian dust free traffic, including use of driveways, to proceed safely with minimum inconvenience, except during actual construction operations. CONTRACTOR provided flaggers shall assist traffic when a street is operating under a single lane. Two-way traffic shall be maintained at all other times unless otherwise authorized by Owner.

CONTRACTOR shall provide, at the work zone location during temporary traffic control installation, a designated Competent Traffic Control Person to ensure compliance with the traffic control plans and the provisions of the Contract. Training Certificates for the designated Competent Person shall be provided with submittals at the Precon. Training certificates for competent persons shall be good for four (4) years from the date of training. After such time the competent person must show that additional training or re-certification has been completed to maintain competent person status.

CONTRACTOR shall maintain a smooth and safe ride for traffic by placing steel plates with Asphaltic concrete berms, temporary fill or bridging and temporary surfacing with cold or hot-mix Asphaltic concrete paving in accordance with applicable City Standards.

Sidewalks shall not be obstructed, except by special permission of Owner or E/A. Access to private dwelling and to commercial establishments shall be provided at all times.

CONTRACTOR shall plan and execute his operations in a manner that will cause a minimum interference with traffic. The CONTRACTOR shall place and maintain in good condition, standard barricades at each end of the Project and at other locations where traffic is rerouted or blocked from using regular traffic lanes. Barricades and warning signs shall be in accordance with Texas Manual on Uniform Traffic Control Devices (MUTCD) and the City of Austin Transportation Criteria Manual.

Signs, barricades and warning devices informing public of construction features shall be placed and maintained by the CONTRACTOR who shall be solely responsible for their maintenance.

Unless otherwise specified elsewhere in Division 1, neither explosives nor blasting shall be permitted on this Project.

#### 3.2 Traffic Control

3.2.1 It shall be the sole responsibility of the CONTRACTOR to furnish, install, maintain and remove barricades, detour signs, warning signs, lights and all regulatory traffic control devices of the size and type specified, at locations indicated, or as directed or approved by the OWNER in accordance with the Texas Manual on Uniform Traffic Control Devices, (MUTCD), Part VI, Traffic Control for Street and Highway Construction and Maintenance Operations and the City of Austin Transportation Criteria Manual. Upon phase completion, the Contractor shall immediately revise the

- temporary traffic devices to reflect the next phase or if the project is complete remove them from the public right of way.
- 3.2.2 Throughout the life of the Contract, all existing roads and Traffic Control devices included in the Work shall be maintained by the CONTRACTOR to a condition, in the opinion of the OWNER, which is equal to or better than that which existed when Work commenced. Maintenance of existing roads and devices shall take priority over all other Work items and shall be subject to a seven-day-a-week, 24-hours-per-day time frame. The CONTRACTOR shall provide a smooth and safe riding surface for all vehicles along the route of this Project. This could include, but not be limited to, small cars, motorcycles, mopeds and bicycles. If the condition of the street surface deteriorates, for any reason, CONTRACTOR shall take necessary steps to insure immediate restoration.
- 3.2.3 During construction of streets, drainage, and utility projects, if conditions of existing street surface require maintenance to upgrade from their state when the Work began, a separate pay item may be included in Bid. Otherwise, maintenance work will not be paid for directly but will be considered subsidiary to various Bid items of this Contract.
- 3.2.4 In the event that CONTRACTOR fails, in opinion of OWNER, to maintain a smooth surface for public comfort, fails to provide ingress and egress to private property, and/or does not provide and maintain proper traffic control devices, OWNER may provide these services and deduct any cost thereof, including overtime and administrative expenses, from all estimates thereafter due the CONTRACTOR. Such action by the OWNER shall not relieve the CONTRACTOR of his liability to protect the public at construction site. Owner may also assess an investigation fee, as established by separate Fee Ordinance, for violations resulting in more than one deficiency report issued to Contractor.
- 3.2.5 A permit must be obtained from Texas Department of Transportation (TxDOT), prior to Work being performed on state highway routes passing through the City.
- 3.2.6 CONTRACTOR shall notify the Owner's Representative, Police Department, Fire Department, EMS, and Right of Way Management Division at least seven Calendar Days in advance of beginning proposed Work, with intention to close or partially block any street or any part thereof, or of any construction affecting free flow of traffic. The CONTRACTOR shall plan and adequately provide barricades and warning devices. The same parties shall be notified when normal traffic flow is restored.
- 3.2.7 Should the CONTRACTOR, in his operations, reduce an existing two-way roadway to less than 20 feet in width, CONTRACTOR shall provide a route through or around the narrowed area as approved by Owner or E/A.
- 3.2.8 The CONTRACTOR's Flaggers shall be required any time it is necessary for the CONTRACTOR's equipment to move into or across an open traffic lane, or at other such times as directed by the Owner's Representative. A flagger shall be utilized to aid exit of hauling equipment from open traffic lanes to the Work area, and entry of hauling equipment from Work area to open traffic lanes. Flaggers shall be dressed and conduct operations in accordance with Texas Manual on Uniform Traffic Control Devices and the Transportation Criteria Manual. Flagging operations shall be the sole responsibility of the CONTRACTOR.
- 3.2.9 The CONTRACTOR and Subcontractors shall confine their activities to the immediate area of the construction site and provide the following:
  - a. Appropriate temporary fences, barricades, and/or Metal Beam Guard Fence if required, for site work involving excavation, utility extensions, remote construction work or other circumstances involving safety of public or protection of the work in progress.

b. Warning lights at open trenches, excavations, etc., during hours from dusk to dawn each day. Protection of structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout and other hazards.

#### 3.3 Spoil Disposal

CONTRACTOR may make other arrangements for spoil disposal subject to E/A evaluation of the CONTRACTOR-supplied proof that the Owner(s) of the proposed site(s) has a valid fill permit issued by the appropriate governmental agency. Finally, the CONTRACTOR shall submit a haul route plan including a map of the proposed route(s) for the E/A and Owner's approval.

#### 3.4 Restoration

- 3.4.1 In order to minimize environmental and potential flood impacts, the sum of the amount of trench opened in advance of the completed line and the amount of trench left unfilled at any time shall be restricted to one (1) full block or 300 linear feet, whichever is less.
- 3.4.2 Restoration shall be an on-going process during construction operations and shall immediately precede completion of construction of each successive section of the line, which shall not exceed 1,200 linear feet without approval of the E/A.

#### 3.5 Street Markers and Traffic Control Signs

It shall be responsibility of the CONTRACTOR to remove, preserve and reset, as required, Street Marker and Traffic Control Signs that are within construction limits to the line and heights as described in Texas Manual on Uniform Traffic Control Devices before any sidewalks or street excavation is begun. Signs shall not be laid on the ground. No payment will be made for this work but shall be considered subsidiary to the various Bid items. Traffic Sign Activity Section of the Transportation Department (457-4850) shall be notified a minimum of five Working Days prior to completion of the Project so that signs may be checked for damage. Any damage to signs or posts shall be paid for by the CONTRACTOR.

#### 3.6 Burning Permit

Open burning within City limits will not be allowed. Trench burning shall require a permit from the Fire Marshal. Burning permits outside City limits shall be obtained from the appropriate authority.

The CONTRACTOR shall secure and pay for all burning permits.

#### 3.7 Driveways

Unless otherwise indicated, the approach grade of existing driveways shall be modified as indicated and as directed by the Owner's Representative. The OWNER will contact property owners whose driveways require grade modification beyond street right-of-way and the OWNER will obtain their concurrence for approach grade modification. Within the right-of-way, all driveways shall be replaced with concrete driveways. Outside the right-of-way, when approach grade modifications are required, flexible base shall be placed by the CONTRACTOR to resurface existing dirt or gravel driveways; asphalt and concrete drives shall be replaced in kind by the CONTRACTOR. Excavation, Flexible Base, Portland Cement Concrete and Asphaltic Concrete, used for driveways as prescribed above shall not be measured for payment but shall be considered subsidiary to various Bid items in the Contract unless payment is included as a separate Contract pay item.

# 3.8 Removal or Relocation of Fences and Sprinkler Systems

Removal or relocation of privately owned fences and sprinkler systems not specified in Bid, and within public right-of-way is the primary responsibility of the property owner. OWNER will cause property owners to be aware of any known conflicts and encourage them to make desired adjustments in advance of construction. In the event the property owner does not,

or will not, make adjustments necessary for construction of improvements to be made under this Contract, CONTRACTOR, after receiving written approval from the OWNER, shall remove those portions that interfere with the Work, as follows:

- 3.8.1 Fences shall be disassembled, by hand, into hand manageable sizes and placed on the private property.
- 3.8.2 For sprinkler systems, the CONTRACTOR, after assuring that electrical and/or mechanical controls are disconnected, shall remove sprinkler heads, valves, controls, and any other miscellaneous items, including distribution pipe, or wire, saw cut from the system. The CONTRACTOR shall present these materials to the property owner. Where piping is cut, the pipe shall be permanently capped or plugged, unless otherwise directed by the OWNER.

Work for removal or relocation of fences and sprinkler systems shall not be paid for directly but shall be subsidiary to the various Bid items.

#### End

#### **PART I - GENERAL**

#### 1.01 SUMMARY

A. Furnish as described by this Section.

#### 1.02 RELATED REQUIREMENTS

- A. Work as called for on PLANS, or in this or any other CONTRACT Specification Sections (e.g. 01300 Submittals, 01650 Facility Startup/Commissioning, 01700 Project Closeout, and other applicable specifications)
- B. This section specifies the general minimum requirements for the contract. Other more specific requirements maybe described in various sections of the specifications. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

#### C. Description of Requirements

#### General

- a. When required by individual Specification Sections or requested by OWNER, submit Operation and Maintenance (O&M) data, which is specifically applicable to the scope of work and is a complete and concise depiction of the provided equipment or product. Data containing extraneous information that has to be sorted through to find applicable instructions will not be accepted. Present information in sufficient detail to clearly explain user O&M requirements at the system, equipment, and component level. Include an index preceding each submittal.
- b. Package Content: For each product, system, or piece of equipment requiring submission of O&M data, submit the package required in the individual Specification Section.
- c. Furnish four (4) draft Operations and Maintenance Manuals explaining the proper installation, operation, and maintenance for each piece of equipment supplied. Draft O&M Manuals will be reviewed by the ENGINEER for compliance with this Section. One (1) draft O&M Manual will be returned to CONTRACTOR noted as either "Revise & Resubmit" or "No Exception Taken".
- d. CONTRACTOR to check and approve O&M Manuals for compliance with requirements of CONTRACT and will so certify by placing CONTRACTOR stamp of approval on each manual prior to submitting to ENGINEER. Any manual submitted without CONTRACTOR's stamp will not be reviewed and will be promptly returned for proper submission. OWNER may assess CONTRACTOR a charge for reviews of same items in excess of three (3) times.
- e. After all O&M Manuals are in acceptable form, CONTRACTOR to furnish to the ENGINEER eight (8) bound hard copies and (8) compact disk-read only memory (CD-ROM) copies, complete sets of Operation and Maintenance Manuals consisting of printed material previously accepted by the ENGINEER for this

purpose. Manuals are to be bound in a heavy duty; fabric reinforced fiberboard, three post, and expandable binder with a maximum binding width of 5". Three-ring vinyl reinforced binders will not be acceptable. Each binder to have an index outlining all information in the set of volumes.

f. Retainage will not be released until the Operation and Maintenance Manuals have been submitted and approved by the ENGINEER.

#### 2. Format

- a. Provide each manual with a project cover sheet identifying OWNER, facility name, facility address, manual volume number, number of volumes in the set, and date.
- b. Divide manual/s into sections paralleling the Equipment Class and sequence as the technical specifications; include additional and/or other specific section/s where designated and/or required.
- c. Within each manual, provide a Table of Contents for that manual. If more than one manual is necessary for a Class of Equipment, place a complete Table of Contents for that Class of Equipment within each manual of that Class.
- d. Sections shall be separated with tabbed index sheets to correlate with the Table of Contents of the manual. The front of each section shall have a cover sheet indicating the equipment sections, provide a legible copy of all vendor supplied drawings for each piece of equipment in a separate binder and include as a drawing volume in the O&M Manual/s set.
- e. Furnish each volume with a complete index for all volumes in the set. The index is to indicate the volume and section for each piece of equipment.
- f. All diagrams, drawings, and illustrations shall be of original quality, reproducible by the dry copy method.
- g. Materials in manuals to be suitable for photographic reproduction. Where copies of identical material are included, clarity and quality of copies to be equal to the original, square to the page. Faxed copies will not be accepted.
- h. Manual/Binder to be 8.5 X 11 inches. Drawings shall be 11 X 17 inches folded to 8.5 X 11 inches size for inclusion in 8.5 x11 inches manual. If 8.5 X 11 inches or 11 X 17 inches drawing is not practical, drawing/s may be folded accordingly and inserted into an envelope/tab provided in the appropriate section of the manual binder. Manual/s to be three post, hard cover, and heavy duty binders with information printed on the front cover of each binder as well as the binder backing. Paper shall be white 20-pound minimum. Each binder shall have an index outlining all information in the set of volumes. Binder size not to exceed four inches (4") thickness; as required, utilize multiple volumes of binders, numbered accordingly.

# D. Types of Information Required in O&M Data Packages

1. Each manual shall be specific to this CONTRACT. All non-applicable information shall be neatly crossed out, and the applicable information shall be color highlighted or otherwise indicated in a manner to prevent confusion of those utilizing the manuals.

The O&M Manual/s shall contain complete information on all mechanical, electrical, instrumentation and control equipment and/or system/s furnished and installed including, but not limited to, the following:

- a. Title Page/Cover Sheet
  - 1) Identification of equipment covered by the manual by providing CONTRACT name, CIP NO., and equipment name and position tag number. These names and tag numbers will be provided to the CONTRACTOR by OWNER Representative.
  - 2) Name of responsible principal, address, telephone number, and area of responsibility of:
    - a) CONTRACTOR
    - b) Subcontractor or installer
    - c) Product manufacturer
    - d) Nearest service center or maintenance CONTRACTOR, as appropriate
    - e) Nearest sour of supply for parts, materials, supplies, or replacement products.
    - f) Neatly typewritten Title Page/Cover Sheet to include:
      - I. Table of Contents
      - II. Table of Contents
      - III. Bill of Materials
      - IV. Equipment Data Sheets
      - V. System and Component Description
      - VI. Installation Instructions
      - VII. Operation Procedures
      - VIII. Maintenance Schedule
        - IX. Maintenance Summary Form
        - X. Troubleshooting Guide
        - XI. Spare Parts, Part Identification, and Drawings
      - XII. Technical Data
      - XIII. Warranties, Bonds, and Service Contracts

XIV. Appendices

XV. Video of O&M training

#### b. Bill of Material

1) Detailing the model, rating and size of each specific component used in the installation. Provide a list of equipment used in the installation. List shall detail the tag name used in the installation, model number, ratings, serial numbers of all pumps, motors, electrical apparatus and instrumentation, and enough information to purchase a replacement.

#### c. Equipment Data Sheets

- 1) An equipment data sheet shall be prepared for each piece of equipment or product covered by the manual.
- 2) Each data sheet shall list the actual equipment nameplate data, process name, and equipment position tag number of an individual product, date of installation, and all data given on the manufacturer's equipment nameplate for that product. When the product consists of separate component; e.g., pump, coupling, and motor; the data sheet shall have separate sections for each component. When a nameplate is not supplied by the manufacturer, design data for the product shall be given.
- 3) The appropriate model/size/item shall be highlighted on all equipment data sheets submittals.

#### d. System and Component Description

- 1) A brief description of the system that the product is a part of, to include all other applicable components of the system.
- 2) A brief description of the relationship between the system components and how they function as a unit.
- 3) Process flow diagram with system/equipment highlighted, as applicable.

#### e. Installation Instructions

1) Manufacturer's instructions for installation of the product, to include all applicable specifications, figures, and drawings.

#### f. Operation Procedures

- 1) Provide written instructions (with control diagrams and other applicable information).
- 2) Applicable start-up and break-in procedures as recommended by the manufacturer, including manual and automatic mod procedures.
- 3) Normal operational procedures.

- 4) System/equipment regulating and control procedures.
- 5) Normal shutdown procedures.
- 6) Seasonal operating instructions.
- 7) Emergency start-up and shut-down procedures.
- 8) Special operation instructions.

#### g. Maintenance Schedule

 All maintenance tasks required or suggested by the manufacturer shall be listed in schedule form to include a description of the task, frequency at which the task is to be done, and other applicable information, such as type of lubricant required, amount of lubricant required or specified test/measurement limits.

#### h. Maintenance Summary Form

1) All Operations and Maintenance Manuals are to include a Maintenance Summary Form in the format and style of the example form attached to this Section as Attachment A. Manuals will not be accepted for review without this form. The Maintenance Summary Form is to be a typed document prepared by the equipment manufacturer specifically for the equipment furnished. Title and subheadings are to be as shown on Attachment A – they are not to be modified. If a subheading is not applicable to the specific piece of equipment, it is to be noted by the words "Not Applicable" after the heading. Additional notes and comments may be added to the end of the form at the manufacturer's discretion.

#### 2) Format

- a) Size: 8½" × 11" (portrait orientation only).
- b) Margins: Top 1", Left 0.75", Right 0.75", Bottom 0.75".
- c) Font:
  - I. Title: Arial 16 point bold.
  - II. Title: Arial 16 point bold.
  - III. Subheadings: Arial 12 point bold.
  - IV. Text: Arial 12 point regular.
  - V. Tables: As shown in Attachment A minimum text size Arial 10 point regular.

#### d) Specific Instructions

I. Equipment Item: Include generic name for equipment along with service and specification reference.

- II. Manufacturer: List manufacturer's physical address for shipping and receiving and mailing address (if different from physical address). Include telephone number and facsimile telephone number.
- III. Equipment Identification Number(s): Provide list of equipment serial numbers cross-referenced to equipment tag numbers in tabular form. When multiple items are provided, list each item separately.
- IV. Total Weight: Note the assembled weight of the equipment.
- V. Nameplate Data: Reproduce the nameplate data exactly as it appears on the equipment. For driven equipment, include the driver nameplate data.
- VI. Manufacturer's Local Representative: Provide the name, address, and phone numbers of the local representative.
- VII. Safety precautions. List personnel hazards and equipment or product safety precautions for all operating conditions.
- VIII. Environmental Conditions: Include a list of environmental conditions (temperature, humidity, and other relevant data) for each product or piece of equipment under which it is best suited to operate.
- IX. Testing Equipment and Special Tool Information: Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

### X. Maintenance Requirements

- i. Maintenance Operation: List briefly each maintenance operation required to maintain warranty in effect and refer to specific information in manufacturer's standard maintenance manual.
- ii. Preventative Maintenance: Preventative Maintenance Plan and Schedule to include manufacturer's schedule for routine preventative maintenance and inspections required to ensure proper and economical operation and to minimize corrective maintenance and repair. Provide manufacturer's projection of preventative maintenance man-hours on an annual basis.
- iii. Recommended calibration instructions and frequency. Instructions shall provide detailed description of the procedure to calibrate the unit.
- iv. Complete disassembly, repair, and reassemble procedures in proper step sequence.
- v. Manufacture specification for alignment, clearances, tolerances, and adjustments where applicable.

- vi. Corrective Maintenance Man-Hours: Include manufacturer's projection of corrective maintenance man-hours. Corrective maintenance that requires participation of the equipment manufacturer to be identified and tabulated separately.
- vii. Applicable labeled section and exploded assembly drawings, and other drawings, figures and sketches as required for clarity of instructions.
- viii. Refer by symbol to lubricant list.
- XI. Lubricant List: List each recommended lubricant by symbol, noting generic type of lubricant, and a minimum of two manufacturers. The recommended lubrication products shall include a specific cross reference to an equivalent Exxon (Mobil) product.
- XII. CONTRACTOR'S Work Assignment: Identify CONTRACTOR'S Work Assignment number.
- XIII. Closest Service Technician: Identify the closest, factory trained, and authorized, service technician by name, address and telephone number. Include pager number if applicable.
- XIV. Closest Parts and Service Center: List closest factory authorized parts and service center, the physical address for shipping and receiving and mailing address (if different from physical address). Include telephone number and facsimile telephone number.
- i. Troubleshooting Guides and Diagnostic Techniques
  - 1) Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or requires replacement. Emergency shutdown and troubleshooting guide. Provide information to shut down and startup the equipment under emergency conditions.
- j. Spare Parts, Part Identification, and Drawings
  - 1) Spare Parts and Supply Lists: Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays.
  - 2) Parts Identification: Provide identification and coverage for all parts of each component and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high- strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without any further identification required. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations and separate listing to show the index, reference, or key number which will cross-reference the illustrated

part to be the listed part. Parts shown in the listings to be grouped by components.

- a) Manufacturer's Standard Commercial Practice (MSCP): The parts data may cover more than one model or series of equipment, components, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.
- b) Other than Manufacturer's Standard Commercial Practice (MSCP): Final assembly manufacturer may add a cross-reference to implement components' assemblies and parts requirements when implementation in manual form varies significantly from the style, format, and method of manufacturer's standard commercial practice. Use the format in the following example:

Final Assembly Manufacturer's Alphanumeric Sequence	Actual Manufacturer's Name and MSCP	Actual Manufacturer Part No.
100001	John Doe & Co. 00000	2000002

#### k. Technical Data

- 1) Detailed description of the function of each principal component in the system. Provide a written description of the individual components function in the overall operation outlined above.
- 2) Test procedures and factory test results if required. Provide a copy of all factory tests performed and a copy of the test results, and performance curves, where applicable.
- 3) Manufacturer's Certified Pump Curves and field pump tests data and pump curves.
- 4) Documentation of field functional tests and performance test described in the specifications. Include the test results and calibration reports of all equipment.
- I. Warranties, Warranty/Asset Management Tracking Form, Affidavits of Installation, and Service Contracts
- m. Prime Contractor will remain single point of contact after final completion for all warranty work.
- n. Warranty Information: List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or CONTRACT documents to keep warranties in force.
- o. The CONTRACTOR shall complete and submit the Asset Management Tracking Form included at the end of this Section. Asset management tag numbers along with warranty information shall be tracked using the form provided and submitted with the required affidavits at the completion of the project. The excel

file of the form included will be provided to the CONTRACTOR upon request. The electronic file as well as hard copies shall be provided to the OWNER as required by the Specifications.

- p. This Asset Management Tracking Form list must be broken down in sufficient detail and approved by OWNER: Sheet to be provided any time that a warranty period is initiated per CONTRACT DOCUMENTS. Provide data for all tagged equipment and components.
- q. The OWNER will provide asset tags for equipment and the CONTRACTOR will be responsible for affixing the tags on the equipment. The CONTRACTOR shall not affix asset management tags until OWNER has accepted the installation.
  - 1) Supplemental Documentation
    - a) General
      - I. Manufacturer's original printed and maintenance instructions for couplings, belt drives, chain drives, or other means of equipment connection, to include applicable tolerances and specifications.
      - II. Manufacturer's original printed operation and maintenance instructions for appurtenances such as solenoid valves, or hydraulic cylinder operators that are a supplied or integral part of the system or product.
      - III. Calibration data sheet including set points. Include all calibration data sheets, as outlined in Calibration and Testing Section.
    - b) Submission of Operation and Maintenance Manuals is applicable to but not limited to the following:
- 1.03 NOT USED
- **1.04 NOT USED**
- 1.05 NOT USED
- 1.06 SUBMITTALS
  - A. No CD-ROM version of manuals shall be submitted prior to the approved final version of the manuals.
  - B. Only one (1) copy of the manual shall be written and submitted on a CD. Multiple copies of the manual submitted on one (1) CD will not be accepted.
  - C. Manuals shall be electronically transcribed matching the title, content, details, page number and sequence of the hard copy versions of the manuals.
  - D. Each CD or copy of the manual shall contain the latest version of Acrobat Reader software, which will allow the OWNER to access and read CD regardless of user's software. The CONTRACTOR can readily download software from the Internet.

- E. CONTRACTOR shall also provide a CD video (DVD) of all O&M training sessions as part of the O&M submittals.
- F. All drawings, cross-sectional view drawings, wiring diagram drawings, connection detail drawings, physical layout and detail drawings, elevations, etc., shall be developed electronically using AutoCAD® Release 14 software (or latest AutoCAD® Release).
- G. All Bill of Material sheets and/or tables indicating product data, quantities, physical location and reference, catalog number, reference, wiring diagram drawing number reference, cost, and any other field entered in the bill of materials sheet and/or any other spreadsheets and/or any other table and/or listings of references, etc., shall all be electronically developed and submitted in a database format, using the latest version of Microsoft® Access software. This applies to all summary sheets, material listings, etc., to be submitted for this Project. Submittals shall include hard-copies and an electronic version developed in Microsoft® Access. Electronic version shall be submitted on CD-ROM and loaded to project FTP site.
- H. AutoCAD® drawings shall be developed in full adherence to the formats and drawing standards defined in the AWU CADD Manual. A copy of the manual may be obtained from the City of Austin Water & Wastewater Utility. Any drawing that is developed or customized for this project by CONTRACTOR, Subcontractor, Supplier or Manufacturer shall be developed in or converted to AutoCAD format and shall be submitted in both electronic AutoCAD format and hard copy with the O&M Manual and loaded to project FTP site.
- I. All Operation and Maintenance Maintenance Instruction Manuals, catalog sheets, product and component data sheets, and factory and on-site (field) test reports/data shall be submitted in bound hard-copies and electronic copies. Electronic copies shall be in Adobe Acrobat® (\*.pdf files) latest edition and in the source software, where possible, including MS Word, Excel, Access, or AutoCAD. Other documents not prepared using these software packages shall be submitted in Adobe Acrobat® (\*.pdf files) latest edition, and shall be submitted on CD-ROM and loaded to project FTP site.
- J. Binders and File Organization of the Electronic Copies: Clearly label each CD-ROM copy of the electronic version of the O&M Manuals. The CD-ROM volume numbers, organization of the electronic files contained within, and labeling formats shall match and be identical to those of the hard-copies. Additionally, in each electronic volume (a CD-ROM), a navigation tool shall be installed that shall guide and navigate the user to open and/or close a desired section and/or subsection (within each volume) simply by clicking on the section/subsection name and number. Install a hard copy of the table of contents in the case (enclosure) of each CD-ROM and CD-ROM copies. All labels and tables of contents shall be neatly typed and labeled. Handwritten labels and/or tables of contents will not be accepted. Organize each set (a complete series) of O&M electronic copies in a CD-ROM hard-plastic case with locking and hinged cover. Install a neatly typed label on each case that shall provide all the information required to be listed on the cover of the O&M Manuals by these Specifications. This cover information should be repeated on the binder spine so that it is easy to read when all binders are stacked on a shelf.
- K. It is the sole responsibility of the CONTRACTOR to ensure that all data submitted by the equipment supplier has been properly translated and incorporated onto the

CD- ROM copies of the manuals. All hard and CD-ROM copies of the manuals shall match. All discrepancies and deviations between the hard and CD0-ROM copies of the manuals shall be corrected at the cost of the CONTRACTOR, unless OWNER's Representative has provided written approval of the deviation.

# 1.07 -1.11 NOT USED\_

PART II - NOT USED

#### **PART III - EXECUTION**

#### 3.01 GENERAL

- A. Submittal Schedule
  - 1. Manuals shall be submitted according to the following schedule:
    - a. The preliminary copies of manuals shall be submitted following approval of the shop drawings, and no later than the on-site delivery for each piece of equipment.
    - b. The Final Operations & Maintenance Manuals will be the source documents for all manufacturer training, when specified, and subsequently for all check-out or start-up activities.

#### 3.02 - 3.11 NOT USED

#### 3.12 MEASUREMENT AND PAYMENT

A. No separate payment for work performed under this Section. Include cost of same in CONTRACT price bid for work of which this is a component part.

#### ATTACHMENT A

# **MAINTENANCE SUMMARY FORM**

<ol><li>EQU</li></ol>	JIPMENT	ITEM:
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- 2. MANUFACTURER INFORMATION:
- 3. EQUIPMENT IDENTIFICATION NUMBER(S):

Equipment Tag Number	 Driver Number	Serial

- 4. TOTAL WEIGHT:
- 5. NAMEPLATE DATA (HP, Voltage, Speed, etc.):
- 6. MANUFACTURER'S LOCAL REPRESENTATIVE:
- 7. MAINTENANCE REQUIREMENTS:

Maintenance Operation	1.	Frequency	<b>Lubricant</b> (if applicable)	Comments

- 8. LUBRICANT LIST:
- 9. SPARE PARTS:

Part Description	Quantity	Part Number

- 10. CONTRACTOR'S JOB ORDER:
- 11. CLOSEST SERVICE TECHNICIAN:
- 12. CLOSEST PARTS AND SERVICE CENTER



# City of Austin Austin Water Utility Asset Management Tracking Form



Facility	Project Number			Project ID									
					]								
Equipment Position /Location Tag	Equipment Description	Manufacturer	Model	Serial Number	Asset Number Sticker	Startup Date	Warranty Expiration Date	Estimated Replacement Material Cost	Estimated Replacement Labor Cost	Expected Useful Life	Start Reading	Expiration Reading	Service Contract Available?
					_								
		-											
													1

END

#### **ARTICLE 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

The following documents are a part of this section:

All documents in Bidding Requirements, Contract Forms and Conditions of the Contract.

Other sections of Division 1 - General Requirements apply to this section.

#### 1.2 DESCRIPTION AND INTENT OF THE WORK

No asbestos containing material (ACM) shall be brought onto the Project site, and/or incorporated into the Project construction without the written consent of the OWNER. Any asbestos containing material found at any time including after contract completion, to have been brought onto the site or incorporated into the Project construction by the CONTRACTOR, or any Subcontractors, Sub-Subcontractors or Suppliers, shall be removed and disposed of in accordance with the then current governmental regulatory standards.

All costs associated with the inspection, sampling, testing, removal and disposal of ACM as described above shall be paid by the CONTRACTOR.

#### 1.3 DEFINITIONS

ASBESTOS: The asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite) cummingtonitegrunerite (amosite), anthophyllite, actinolite and tremolite.

ASBESTOS CONTAINING MATERIAL (ACM): Any material containing more than one percent (1%) by weight of asbestos of any type or mixture of types.

ASBESTOS CONTAINING BUILDING MATERIAL (ACBM): Any material used in the construction of, or incorporated into the construction of, any building that contains more than one percent (1%) by weight of asbestos of any type or mixture of types.

MSDS: A material safety data sheet (MSDS) is a form containing data regarding the properties of component substances that comprise a manufactured product. They are a basic hazard communication tool that gives details on chemical and physical dangers, safety procedures, and emergency responses for chemicals.

#### 1.4 QUALITY ASSURANCE

#### PROHIBITION OF ASBESTOS CONTAINING MATERIALS

The E/A has been instructed to not permit any asbestos containing materials to be specified, requested or approved for use in conjunction with this Project.

The E/A has signed the following:

- A. 01900A Statement of Non-Inclusion of Asbestos Containing Material (E/A, Prior to Design): stating that the Engineer/Architect shall not specify, request or approve any ACM in this Project without prior written approval of OWNER.
- B. 01900B Statement of Non-Inclusion of Asbestos Containing Material (E/A, After Design): stating that the Engineer/Architect has not specified, requested or approved any ACM in this Project without the prior written approval of the OWNER, and that any ACM allowed in this Project is identified in the Statements.

These Statements are included in the Construction Documents.

#### ASBESTOS CONTAINING MATERIALS PROHIBITED FROM SITE

No asbestos containing materials will be permitted as part of the Project construction. The following list is intended to be used as a general guide to show which types of materials are suspected to contain asbestos:

- Cement Pipes
- Cement Wallboard
- Cement Siding
- Asphalt Floor Tile
- Vinyl Floor Tile
- Vinyl Sheet Flooring/vinyl wall coverings
- Flooring Backing
- Construction Mastics (floor tile, carpet, ceiling tile, etc.)
- Acoustical Plaster
- Decorative Plaster / stucco
- Textured Paintings/Coatings
- Ceiling Tiles and Lay-in Panels
- Spray-Applied Insulation
- Blown-in Insulation
- Fireproofing Materials
- Taping Compounds (thermal)
- Packing Materials (for wall/floor penetrations)
- High Temperature Gaskets
- Laboratory Gloves
- Fire Blankets
- Fire Curtains
- Elevator Equipment Panels

- Elevator Brake Shoes
- HVAC Duct Insulation
- Boiler Insulation
- Breeching Insulation
- Ductwork Flexible Fabric Connections
- Cooling Towers
- Pipe Insulation (corrugated air-cell, block, etc.)
- Heating and Electrical Ducts
- Electrical Panel Partitions
- Electric Cloth
- Electric Wiring Insulation
- Chalkboards
- Roofing Shingles / tiles / membranes
- Roofing Felt
- Roof Coatings
- Base Flashing
- Thermal Paper Products
- Fire Doors
- Caulking/Putties
- Adhesives / mastics
- Wallboard
- Joint Compounds
- Spackling Compounds
- Laboratory hoods/tabletops
- CMU block fill materials

If any of these suspect materials are specified for use on the Project, and if they do not have specific labelling identifying them as asbestos free, then the CONTRACTOR shall notify the OWNER immediately. Laboratory analysis of the material by an OWNER-approved laboratory shall be performed at CONTRACTOR's expense in order to warrant that the material does not contain asbestos. A copy of the package labelling or results of laboratory testing must be provided to the OWNER prior to inclusion of the specified material during construction. Contractor's construction submittals must include MSDSs for all new materials used in construction of buildings, facilties and infrastructure.

#### 1.5 SUBMITTALS

#### NON-USE OF ASBESTOS AFFIDAVITS

At the time that the CONTRACTOR signs the Agreement, they shall sign a Non-Use of Asbestos Affidavit (Contractor Prior to Construction), Contract Document 00680. This Affidavit certifies that the CONTRACTOR agrees that they will not allow any asbestos containing materials to be incorporated into the construction of the Project or allow any asbestos containing building materials on the site for which the OWNER has not given prior written approval.

Prior to final payment, the CONTRACTOR will provide to the OWNER a Non-Use of Asbestos Affidavit (Contractor After Construction), Contract Document 00681. This Affidavit certifies that the CONTRACTOR did not allow asbestos containing materials to be incorporated into the construction or allowed any asbestos containing building materials on the site for which the OWNER of the Project did not give prior written approval.

ASBESTOS CONTAINING MATERIALS: When any asbestos containing materials are used on the Project, provide the following information:

A detailed description of the material containing the asbestos.

The type and percent of asbestos contained in the material.

The quantity of the materials used, including the square footage, or in the case of pipe insulation, the size and linear footage.

A drawing showing the exact location of any asbestos containing materials.

Final payment shall be withheld until the above described Affidavits, submittals and/or information are received and approved.

**END** 

# STATEMENT OF NON-INCLUSION OF ASBESTOS CONTAINING MATERIAL

STATE OF TEXAS	ENGINEER/ARCHITECT						
COUNTY OF TRAVIS	PRIOR TO DESIGN						
COUNTY OF TRAVIO	THOR TO DESIGN						
"My name is Rubén López, Jr.	. hereinafter known as Authorized						
Representative.	Referrance known as Authorized						
representative.							
"I am over the age of 18 years and I have never been convicted of a crime. I am theEnginee:	of						
Public Works Department, Engineering Services Division	hereinafter known as						
ENGINEER/ARCHITECT.							
"I am fully competent to make this statement. I have personal knowledge of the facts set forth below	v and they are all true and correct.						
"WHEREAS ENGINEER/ARCHITECT has been selected to provide designs, to prepare the bid and construction documents, and to assist							
the City of Austin, Texas, hereinafter known as OWNER, during the construction of							
SPRINGDALE/290 WATER LINE IMPROVEMENTS	, located at						
City of Austin, Texas	Austin Texas						
hereinafter known as Project, and							
neremater known as rioject, and							
"WHEREAS asbestos in a dust form is a recognized health hazard, and "WHEREAS the OWNER desires not to have any asbestos containing materials used or incorp." THEREFORE the ENGINEER/ARCHITECT affirms that to the best of its knowledge and belief.  1. The ENGINEER/ARCHITECT, any person, firm or organization representing or representing specify, request, or approve for use in conjunction with the Project, any adefined as containing asbestos by any laws, rules or regulations promulgated by the any governmental organization or agency operating under the authority of either of the secondary of the authority of either of the secondary of the authority of either of the secondary of the secondary of the authority of either of the secondary of the secondary of the authority of either of the secondary of the secondary of the secondary of the authority of either of the secondary of the seco	resented by the ENGINEER/ARCHITECT, shall not sbestos containing materials or any other materials e United States Government, the State of Texas or nose entities.  Pestos containing material cannot be obtained, the ning material:  specify asbestos containing materials.  Ing of any asbestos containing materials.  In a for this Project, provide to the Project Manager, you of asbestos they contain, and the percent of an ining materials not approved by the OWNER for niple analysis performed by an individual(s) and/or overnment and/or the State of Texas, to have been a inclusion in the Project, the OWNER shall look to be removal and/or other abatement of said asbestos and in the Project due to the incorporation of asbestos to the Project due to the incorporation of asbestos to the ENGINEER/ARCHITECT.  In the ENGINEER/ARCHITECT.						
Signature of Authorized Representative:	the p						
STATE OF TEXAS							
COUNTY OF TRAVIS							
ON August 23, 20/8 personally appeared Ruben	Lopez JR						
and been duly ewern by me, subscribed to the	foregoing statement and has stated that the facts						
stated therein are true and correct.	A State and has stated that the lacts						
Notary Public, State of Texas	y-traces						
District Name of Naton / 1	nda Rexanne Campa						
	ebruary 27,2019						
	01605A.00/110392						

# STATEMENT OF NON-INCLUSION OF ASBESTOS CONTAINING MATERIAL

STATE OF TEXAS COUNTY OF TRAVIS	ENGINEER/ARCHITECT AFTER DESIGN							
"My name is Rubén López, Jr.	_, hereinafter known as Authorized							
Representative.								
"I am over the age of 18 years and I have never been convicted of a crime. I am the Engineer	1							
Public Works Dept., Engineering Services Division hereinafter known as ENGINEER/ARCHITECT.								
"I am fully competent to make this statement. I have personal knowledge of the facts set forth below and they are all true and correct.								
"WHEREAS ENGINEER/ARCHITECT has been selected to provide designs, to prepare the bid and construction documents, and to assist								
the City of Austin, Texas, hereinafter known as OWNER, during the construction of								
SPRINGDALE/290 WATER LINE IMPROVEMENTS	, located at							
City of Austin, Texas	Austin, Texas,							
hereinafter known as Project, and								
<ul> <li>"THEREFORE the ENGINEER/ARCHITECT affirms that to the best of its knowledge and belief</li> <li>The ENGINEER/ARCHITECT, any person, firm or organization representing or rep shall not knowingly specify, request, or approve for use in conjunction with the Pro any other materials defined as containing asbestos by any laws, rules or regul Government, the State of Texas or any governmental organization or agency oper entities.</li> <li>The only exceptions to the above statement are the following materials that are req containing material cannot be obtained. The inclusion of these materials has Manager for this Project.</li> </ul>	resented by the ENGINEER/ARCHITECT, ject, any asbestos containing materials or ations promulgated by the United States ating under the authority of either of those uired because a satisfactory non-asbestos							
<ol> <li>The ENGINEER/ARCHITECT states its understanding that if any asbestos contains for inclusion into the Project, are determined, as a result of any inspection and san and/or firm(s) certified and/or licensed to perform such inspection by the United State to have been knowingly specified, requested and/or approved by the ENGINEER/A OWNER shall look to the ENGINEER/ARCHITECT for reimbursement of any an other abatement of said asbestos containing materials.</li> <li>ENGINEER/ARCHITECT further understands that OWNER shall also look to the damages to OWNER which result from the inability of the OWNER to use an incorporation of asbestos containing materials that have been knowingly specification of asbestos containing materials that have been knowingly specification of asbestos containing materials that have been knowingly specification.</li> <li>ENGINEER/ARCHITECT.</li> <li>ENGINEER/ARCHITECT further understands that OWNER will pursue reimburement any said damages from the ENGINEER/ARCHITECT by any and every means within Signature of Authorized Representative:</li> </ol>	ple analysis performed by an individual(s) tes Government and/or the State of Texas, RCHITECT for inclusion in the Project, the d all costs incurred in the removal and/or ENGINEER/ARCHITECT for any and all portion or all of the Project due to the fied, requested and/or approved by the ent of any said cost and compensation for							
STATE OF TEXAS COUNTY OF TRAVIS  ON August 23, 20/8 personally appeared Ruben								
and been duly sworn by me, subscribed to the facts stated therein are true and correct.	e foregoing statement and has stated that							
Notary Public, State of Texas	12-11-12-0-11							
Printed Name of Notary LIMO O	27 2010							
LINDA ROXANNE CAMPOS MY COMMISSION EXPIRES February 27, 2019  My Commission Expires: February 27, 2019	01605B/110392							



# SCOPE OF WORK FOR ASBESTOS ABATEMENT ACTIVITIES

IN SUPPORT OF

# **SPRINGDALE/290 WATER LINE**

**IMPROVEMENTS** 

CIP 6935.022

**AUSTIN, TEXAS** 

BY
CITY OF AUSTIN
BUILDING SERVICES DEPARTMENT
AUSTIN, TEXAS 78702
(512) 974-7154

**AUGUST 29, 2018** 

#### **DIVISION 1 - GENERAL REQUIREMENTS**

01901	Scope of Work - Asbestos Abatement
01902	Project Coordination - Asbestos Abatement
01904	Codes and Regulations - Asbestos Abatement
01910	Worker Protection - Asbestos Abatement
01911	Respiratory Protection _ Asbestos Abatement
01915	Work Area Clearance _ Asbestos Abatement
01917	Disposal of Asbestos Containing Waste Materials

C.Wash M 8.29.18

C. Wade Mullin Licensed Asbestos Consultant License Number 10-5093 Expiration Date 2/7/2019

# SCOPE OF WORK **ASBESTOS ABATEMENT**

# PROJECT/WORK IDENTIFICATION

Project name is Asbestos Abatement in support of the Springdale/290 Water line Improvements Project CIP 6935.022.

#### **PART 1 - GENERAL:**

This project is to be conducted in accordance with the Texas Asbestos Health Protection Act, as amended, Chapter 1954, Texas Occupations Code, effective June 1 2003, formerly Texas Civil Statues, Article 4477-3a, 29 CFR 1910.1001, 29 CFR 1926.1101, 40 CFR part 763 subpart G and 40 CFR part 61 subpart M.

The location and approximate quantities of asbestos materials provided in these specifications are estimates only and do not include any hidden materials not identified. The Contractor is responsible to field verify for actual quantities which these plans and specifications represent. No additional compensation will be made to the Contractor(s) for differences between the estimated quantities and the actual quantities unless prior written approval is obtained from the Owner or his representative.

The Contractor's asbestos abatement workers shall have the appropriate certifications, licenses, and training for asbestos abatement work and supervision in the State of Texas.

#### 1.01 Summary of Work:

Briefly and without force and effect upon the contract documents, the work of the contract can be summarized as follows:

The purpose of this item is to remove and dispose of asbestos containing materials (ACM) associated with asbestos containing (AC) transite pipe for the Springdale/290 Water line Improvements Project CIP 6935.022.

The Contractor is required to assist the general contractor in removing one full joint of 8 inch diameter AC pipe at tie-in location on Sansom Road and remove one full section of 12 inch diameter AC pipe at tie-in location on Chimney Hill Blvd. The asbestos contractor will assist with any connections, removal of segments and all taps and tie-ins to AC pipe. Any AC pipe scheduled to be abandoned will be properly grouted per CoA specifications. The contractor will remove and dispose of as ACM all asbestos cement pipe and debris using the procedures as outlined below. In addition, the contractor is to assist with any connections to existing asbestos cement piping.

The Contractor shall conduct all abatement work in accordance with the current revisions to the Texas Department of Health Rules, T.A.H.P.R. dated March 2003.

Cwart M 8.29.16

Scope of Work for Building Services Department

Asbestos Superintendent: Provide a full-time Asbestos Superintendent on site who is licensed in accordance with Texas Civil Statutes, Article 4477-3a, paragraph 289.144, and all adoptions to Article 4477-3a, and experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Competent Person as required by OSHA in 29 CFR 1926.1101 for the Contractor and is the Contractor's representative responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos containing materials.

Asbestos Workers: All workers actively involved in the removal and replacement of asbestos material will be Licensed Asbestos Workers with the State of Texas.

# Removal of AC Water and/or Wastewater Lines

The Contractor shall establish a regulated area with caution tape surrounding the work area and place a drop cloth consisting of six mil thick sheet plastic below the pipe where it will be cut or otherwise disturbed. The Contractor can use a hammer and chisel to split the top and bottom of the couplings (collars) on each end so that an entire section of pipe can be removed. The couplings shall be kept wet with amended water (water to which a surfactant has been added) or a removal encapsulant while this is being done. Once this has been accomplished, the section of pipe and the couplings can be removed from the trench and wrapped in two layers of true six mil thick sheet plastic. Completely seal the sheet plastic with duct tape and duct tape any tears in the plastic. The Contractor is not allowed to use high speed saws to cut the pipe at any time. If needed, hand operated cutters or chain mounted snap cutters can be used as long as the area to be cut is kept wet with amended water or a removal encapsulant during this process. As stated above, if the Contractor chooses to use a hand operated cutter or chain mounted snap cutter, a drop cloth consisting of six mil thick sheet plastic shall be placed below the area to be cut. All debris collected on the drop cloth as well as the drop cloth itself, shall be kept wet during removal and promptly placed into a disposal bag and sealed using duct tape at the completion of the removal process. All visible debris located in the trench shall also be placed into a disposal bag. Once this has been accomplished, the disposal bag containing the debris and the drop cloths shall be placed into another disposal bag and sealed using duct tape. All protective clothing worn by the Contractor and their personnel shall also be placed in disposal bags. At the end of the project, the Contractor shall discard their respirator filters as ACM by disposing of them in disposal bags. The disposal bags used to contain all asbestos containing debris, drop cloths, protective clothing, and respirator filters shall adhere to the following guidelines:

<u>Disposal Bags</u>: Provide 6 mil thick leak-tight polyethylene bags labeled with three labels with text as follows:

First Label:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID OPENING OR BREAKING CONTAINER
BREATHING ASBESTOS IS HAZARDOUS TO YOUR HEALTH

<u>Second Label</u>: Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER

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# CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD BREATHING AIRBORNE ASBESTOS, TREMOLITE, ANTHOPHYLLITE, OR ACTINOLITE FIBERS IS HAZARDOUS TO YOUR HEALTH

<u>Third Label</u>: Provide in accordance with U.S. Department of Transportation Regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances: Final Rule:

RQ HAZARDOUS SUBSTANCE, CLASS 9, NA2212, PG III (ASBESTOS)

All transporters of asbestos containing materials shall be licensed by the Department of State Health Services.

The Contractor shall label all piping wrapped in true six mil thick sheet plastic with the same type of labeling as the disposal bags.

All equipment used on this project (i.e. HEPA-vacuums) shall be free of any visible debris and operational. The Owner's Representative along with the Contractor's designated supervisor shall inspect all equipment prior to it being brought into the work area. If any debris found on the equipment is suspected to be ACM, the equipment shall be wet wiped and decontaminated. The decontamination of the equipment shall not take place on the project site.

If applicable, all taps to existing water lines are to be conducted using wet/pressure tapping. Once the taps are made the hydrants shall be flushed on both sides of the work area to help prevent contamination of the water supply. Installing a wastewater service in AC pipe shall be done by removing a full section of pipe and installing a "tee". Replace the remainder of pipe as specified.

All removal work associated with the ACM piping shall be done using the appropriate worker protection and respiratory protection as stated below as a minimum:

The minimum respiratory protection during removal will be half face dual cartridge respirators equipped with HEPA cartridges. The Contractor shall provide information to assure that the above respiratory protection is sufficient in accordance with 29 CFR 1926.1101 negative exposure assessment requirements.

The abatement must comply with these Specifications, the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), State of Texas and local regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

The Contractor shall submit a work plan detailing the work procedures they will employ. This work plan shall be reviewed and approved by the Owner's Representative prior to any removal work.

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Scope of Work for Building Services Department

The Contractor shall provide all workers working in the vicinity of active electrical sources with appropriate protective equipment including insulating gloves, boots, and non-conductive tools (while HEPA-Vacuuming).

The Contractor will inform the Owner and Owner's Representative of any hidden or unidentified conditions which may result in a change order or additional cost to the bid price of the contract. This notice will require written approval by the Owner's Representative prior to accomplishing the additional work.

The Contractor will be required to repair any damage to the facility or equipment of the Owner as the result of the abatement project. Any replacement items (paint, panels, etc.) will be of equal quality and color of the damaged items. This work shall be accomplished at the completion of the abatement project and prior to the Owner re-occupying the space. The project will not be considered complete until the repair work has been done and found acceptable by the Owner.

All asbestos containing materials shall be wetted with amended water or a removal encapsulant prior to and during the removal. The contractor can start the removal process after the Owner's Representative is satisfied that the ACM has been adequately wetted. The Owner's Representative has been given the authority to present the contractor with either a written or verbal Stop Work Order if they notice that any ACM is being removed without it being adequately wetted or if they become aware of any deviation from the project specifications or Department of State Health Services Regulations.

Final clearance for asbestos abatement work shall be obtained by PCM method as outlined in Section 01915. Upon successful completion of required work activities the Owner's Representative shall visually inspect the work area for final clearance. Downwind area air samples collected during abatement can be used as final clearance samples if they do not exceed 0.01 f/cc by Phase Contrast Microscopy analysis.

All equipment used on this project (i.e. HEPA-vacuums, negative air machines) shall be free of any visible debris and operational. The Owner's Representative along with the contractor's designated supervisor shall inspect all equipment prior to it being brought into the work area. If any debris found on the equipment is suspected to be ACM, the equipment shall be wet wiped and decontaminated. The decontamination of the equipment shall not take place on the project site.

The Contractor shall adequately staff this project such that it will be completed in accordance with the Contract Documents. If the project is not completed within this time frame, the Owner will backcharge the Contractor for any charges incurred by the Owner for additional Owner Representative services required to complete this project.

The Contractor shall submit the names and resumes (including pertinent project experience) of at least two (2) properly licensed supervisors to be used to conduct this asbestos abatment project. If the supervisors submitted are approved by the Owner, the Contractor shall ensure that at least one of these project supervisors are on site throughout the project including final tear down operations. The Contractor shall not substitute an approved project supervisor without the prior approval of the Owner.

All Contractor worker and supervisory personnel at the work site shall properly trained, equipped and possess valid and current Texas Department of State Health Services Asbestos Licenses and associated training certificates. During all phases of this project, the Contractor project site

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supervisor shall remain at the project site during all work activities.

The Contractor shall submit a work plan detailing the work procedures they will employ. This work plan shall be reviewed and approved by the Owner's Representative prior to any removal work.

The Contractor shall provide all workers working in the vicinity of active electrical sources with appropriate protective equipment including insulating gloves, boots, and non-conductive tools (while HEPA-Vacuuming).

The abatement must comply with these Specifications, the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), State of Texas and local regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

The Contractor will inform the Owner and Owner's Representative of any hidden or unidentified conditions which may result in a change order or additional cost to the bid price of the contract.

This notice will require written approval by the Owner's Representative prior to accomplishing the additional work.

#### **ASBESTOS ABATEMENT**

During the Work, the City or the City's Representative will provide a licensed asbestos inspector to oversee the Contractor's abatement work, collect area samples, and identify asbestos-containing materials. The Contractor shall coordinate the abatement schedule with the asbestos inspector such that the inspector can be present at key times during the abatement and identify asbestos-containing materials as soon as suspect material is encountered. The Contractor shall also accept all City Representative decisions regarding the presence of asbestos-containing materials. The contractor shall conduct their own required employee monitoring for asbestos related activities in conformance with OSHA requirements.

The Contractor shall notify the City's Representative asbestos inspector of any suspected asbestoscontaining materials encountered during the work as soon as it is discovered.

The Contractor shall abate or contain for disposal all asbestos-containing materials encountered during the equipment dismantling work if abatement or containment is required to prevent asbestos release during dismantling.

Where asbestos-containing materials requiring abatement are encountered during the project, the Contractor shall stop work and abate the material or otherwise contain it for disposal as necessary. Until abatement can be performed, the Contractor shall take actions as necessary and feasible to protect workers from exposure to airborne asbestos and prevent disturbance of the material. The contractor will establish a regulated area until such time as the area or equipment can be abated.

The Contractor shall provide personnel to perform the surveillance of asbestos abatement containment areas 24 hours per day, 7 days per week during the operation of ventilation units. The duties of such personnel shall include maintenance of pressure differential containment and regular inspection of the work areas for fire prevention and prevention of incidents which could cause the release of materials.

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Scope of Work for Building Services Department

#### **ASBESTOS CONTAINING MATERIALS**

The following asbestos containing materials are known to be present at work sites along Springdale Road and 290 in Austin Texas. If any other materials are found, which are suspected of containing asbestos notify immediately the Owner's Representative. The amount of ACM listed below are approximate. The Contractor shall field verify the quantities.

LOCATION	ITEM	APPROXIMATE AMOUNT	TYPE OF ASBESTOS
Along road	AC Pipe	32 Linear feet	est 50% Chrysotile

#### 1.02 INSPECTION:

Prior to commencement of work, inspect all areas in which work will be performed. Prepare a listing of damage to structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from the work. Photograph or video tape existing conditions as necessary to document conditions. Submit to Owner's Representative prior to starting work.

# 1.03 PLAN OF ACTION:

Submit a detailed plan of the procedures proposed for use in complying with the requirements of this Specification. Include in the plan the location and layout of decontamination areas, the sequencing of asbestos work, the interface of trades involved in the performance of work, methods to be used to assure the safety of building occupants and visitors to the site, disposal plan including location of approved disposal site, and a detailed description of the methods to be employed to control pollution. Expand upon the use of portable HEPA ventilation system, closing out of the area HVAC system, method of removal to prohibit visible emissions in work area, and packaging of removed asbestos debris. The plan must be approved by the Owner's Representative prior to commencement of work.

#### 1.04 POTENTIAL ASBESTOS HAZARD:

The disturbance or dislocation of asbestos containing materials may cause asbestos fibers to be released into the building's atmosphere, thereby creating a potential health hazard to workmen and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the jobsite of the seriousness of the hazard and of proper work procedures which must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified asbestos containing materials, take appropriate continuous measures as necessary to protect the building from the contamination with airborne asbestos. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

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# 1.05 CONTRACTOR USE OF PREMISES:

General: The Contractor shall limit his use of the premises to the work indicated.

<u>Use of the Site:</u> Confine operations at the site to the areas permitted under the contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project abatement.

Keep existing driveways, parking spaces and entrances serving the premises clear and available to the Owner and his employees at all times.

Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage to areas indicated at the pre-abatement meeting.

Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place or accessible to unauthorized persons.

Use of existing toilets within the building by the Contractor and his personnel, will not be permitted.

Owner Occupancy: The building will not be occupied by the Owner during the asbestos abatement project.

#### 1.06 SUBMITTALS

The Contractor shall prepare an Asbestos Abatement Plan and submit it to the City with the Contractor's Health and Safety Plan (HASP) prior to mobilization. The Asbestos Abatement Plan shall include the following information:

Discussion of the general plan for containment around equipment to be abated, decontamination plans, and waste management procedures.

Drawings showing general containment, decontamination, and bag out facility plans.

Contractor's work schedule, including a plan for sequencing work around areas or individual pieces of equipment that require asbestos abatement.

Waste containment plan, describing how the Contractor will abate particular pieces of equipment.

A plan for protecting the safety of workers and visitors in the surrounding areas.

A fire and containment protection plan, including emergency procedures and contacts.

Current copies of all applicable permits, licenses, certifications, training documents, and regulatory notices.

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List of asbestos abatement workers with social security numbers

Certificates of worker acknowledgement

Medical examination results

Before the Start of Work: Submit the following to the Owner and Owner's Representative for review. Do not begin work until these Submittals are returned with Owner's Representative's action stamp indicating that the submittal is returned for unrestricted use or final-but-restricted use. *Allow 3 days time for review of submittals.* 

- A. Plan of Action: Submit as a written report.
- **B. Inspection:** Submit written report on inspection carried out as required by this section. Include copies of all photographs, videotapes, etc.
- C. Alternative Methods: Submit, in writing, any alternative methods proposed to accomplish the work of this contract.
- D. Submit copies of valid and current Texas Department of State Health Services Asbestos Licensing and associated training certificates for all worker and supervisory personnel at the work site. In addition, copies of the appropriate DOT certifications required for the manifesting and transporting of hazardous materials must be submitted.

#### SPECIAL SPECIFICATIONS

In addition to the work procedures outlined in the Master Specification which apply to the project described herein, the following Special Specifications apply:

The contractor shall conduct all abatement work in accordance with the current revisions to the Department of State Health Services Rules, T.A.H.P.R. dated March 2003.

**END OF SECTION** 

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#### PROJECT COORDINATION

# PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, and other Division-1 Specification sections, apply to work of this section.

# 1.02 ABATEMENT TIME:

The use of insufficient labor or equipment for abatement purposes or inadequate scheduling of materials or equipment will not be allowed as cause for delay. Extension of time or extra cost will not be allowed for failure to complete the project on time due to insufficient labor or equipment.

# 1.03 ADMINISTRATIVE AND SUPERVISORY PERSONNEL:

General Superintendent: Provide a full-time General Superintendent on site who is licensed in accordance with Texas Civil Statutes, Article 4477-3a, paragraph 289.144, and all adoptions to Article 4477-3A, and experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Competent Person as required by OSHA in 29 CFR 1926 for the Contractor and is the Contractor's representative responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos containing materials.

Asbestos Workers: All workers actively involved in the removal and replacement of asbestos material will be Licensed Asbestos Workers with the State of Texas.

# 1.04 PROGRESS MEETING

In addition to specific coordination and pre-construction meetings, and other regular project meetings held for other purposes, the Owner's Representative will hold general progress meetings as required. The meetings will be attended by a representative of the contractor authorized to make decisions for the contractor.

# 1.05 PRE-CONSTRUCTION CONFERENCE:

An initial progress meeting, recognized as the "Pre-Construction Conference" will be convened by the Owner and the Owner's Representative prior to the start of any work. The meeting will be attended by the general superintendent of the contractor, Owner's Representative(s), project administrator, and other entities concerned with the asbestos abatement work.

#### 1.06 DAILY LOG

General: Maintain within the decontamination unit a daily log documenting the dates and time of, but not limited to, the following items:

Personnel, by name, entering and leaving the work area, air monitoring results, and any equipment/supplies decontaminated and brought out through the decontamination unit.

# 1.07 SPECIAL REPORTS:

<u>General:</u> Except as otherwise indicated, submit special reports directly to the Owner's Representative or the Owner within one day of occurrence requiring special report, with copy to others affected by occurrence.

Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary containments), prepare and submit a special report listing chain of events, persons participating, response by contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise Owner in advance at earliest possible date.

Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

# 1.08 CONTINGENCY PLAN:

<u>Contingency Plan:</u> Prepare a contingency plan for emergencies including fire, accident, power failure, negative air system failure, or any other event that may required modification or abridgment of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency.

<u>Post:</u> In clean room of the personnel decontamination unit telephone numbers and locations of emergency services including but not limited to fire, ambulance, doctor, hospital, police, power company, telephone company.

# 1.09 NOTIFICATIONS

Notify other entities at the job site of the nature of the asbestos abatement activities, location of asbestos containing materials, requirements relative to asbestos set forth in these specifications and applicable regulations.

<u>Notify Emergency Service Agencies</u> including fire, police, ambulance or other agency that may service the abatement work site in case of an emergency. Notification is to include methods of entering work area, emergency entry and exit locations, and other information needed by agencies providing emergency services.

# PART 2 - PRODUCTS (Not Applicable)

# PART 3 - EXECUTION (Not Applicable)

- END OF SECTION -

#### **CODES AND REGULATIONS**

# PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the contract, and other Division-1 Specification sections, apply to work of this section.

# 1.02 DESCRIPTION OF THE WORK:

This section sets forth governmental regulations and industry standards which are included and incorporated herein by reference and made a part of the specification. This section also sets forth those notices and permits which are known to the Owner and which either must be applied for and received, or which must be given to governmental agencies before start of work.

Requirements include adherence to work practices and procedures set forth in applicable codes, regulations and standards.

Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with codes, regulations and standards.

# 1.03 CODES AND REGULATIONS:

General Applicability of Codes, Regulations and Standards: Except to the extent that more explicit or more stringent requirements are written directly into the contract documents, all applicable codes, regulations, and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies are bound herewith.

<u>Contractor Responsibility:</u> The contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State and local regulations. The contractor shall hold the Owner and Owner's Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

<u>Federal Requirements:</u> Which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final rules, Title 29, Part 1910, section 1001 and part 1926, Section 1101 of the Code of Federal Regulations

Respiratory Protection; Title 29, Part 1910, Section 134 of the Code of Federal Regulations Construction Industry; Title 29, Part 1926, of the Code of Federal Regulations

Construction Industry

Title 29, Part 1926 of the Code of Federal Regulations

Access to Employee Exposure and Medical Records, Title 29, Part 1910, Section 2 of the Code of Federal Regulations

Hazard Communication; Title 29, Part 1910, Section 1200 of the Code of Federal Regulations

Specifications for Accident Prevention Sign and Tags; Title 29, Part 1910, Section 145 of the Code of Federal Regulations

#### U.S. Department of Transportation:

Hazardous Substances

Title 49, Part 171 and 172 of the Code of Federal Regulations

U.S. Environmental Protection Agency (EPA) including but not limited to:

Asbestos Abatement Projects Rule 40

40 CFR Part 763

CPTS 62044, FRL 2843-9

Title 34, Part 231, Appendix C, Procedures for Containing and Removing Building Materials Containing Asbestos

Title 40, Part 61, Sub-part A of the Code of Federal Regulations National Emission Standard for Asbestos

Title 40, Part 61, Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

American National Standards Institute (ANSI) Publication:

Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust Systems

American Society for Testing and Materials (ASTM) Publication:

E 849-82 Safety and Health Requirements relating to Occupational Exposure to Asbestos

<u>State Requirements:</u> Texas Civil Statues, Article 4477-3a, and all adoptions, (TAHPR) Asbestos Exposure in Public Buildings, requires licensure of persons engaged in the removal or encapsulation of asbestos, or other asbestos related activities in all buildings of public occupancy or access.

<u>Local Requirements:</u> Abide by all local requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials.

# 1.04 STANDARDS:

General Applicability of Standards: Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.

<u>Contractor Responsibility:</u> The Contractor shall assume full responsibility and liability for the compliance with all standards pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying area adjacent to the site. The Contractor shall hold the Owner and the Owner's Representative harmless for failure to comply with any applicable standard on the part of himself, his employees, or his sub-contractors.

<u>Standards:</u> Which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

American National Standards Institute (ANSI) 1430 Broadway New York, New York 10018 (212) 354-3300

Fundamentals Governing the Design and Operation of Local Exhaust Systems Publication Z9.2-79

Practices for Respiratory Protection Publication Z288.2-80

American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103 215/299-5400

Safety and Health Requirements Relating to Occupational Exposure to Asbestos E 849-82

Specification for Encapsulants for Friable Asbestos Containing Building Materials Proposal P-189

"Guide" Specification - 02080 Asbestos Removal AIA Service Corporation 1735 New York Avenue NW Washington, DC

AWCI Guide Specifications for the abatement of asbestos release from spray-or trowel applied materials in buildings and other structural designs

U.S. Department of Commerce

National Institute of Standards & Technology

National Engineering Lab

Center for Building Technology

# 1.05 EPA GUIDANCE DOCUMENTS:

<u>EPA Guidance Documents:</u> Which discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below for the Contractor's information only. These documents do not describe the work and are not a part of the work of this contract. EPA maintains an information number (800-334-8571), publications can be ordered from (800-424-9065) and (554-1404 in Washington, DC):

Asbestos-Containing Materials in School Buildings - A Guidance Document Part 1 & 2 (Orange Books) EPA C00090 (out of print)

Guidance for Controlling Asbestos-Containing Materials in Buildings EPA 560/5-85-024 (Purple Book)

Friable Asbestos-Containing Materials in Schools: Identification and Notification Rule (40 CFR Part 763)

Evaluation of the EPA Asbestos-In-Schools Identification and Notification Rule EPA 560/5-84-005

Asbestos in Buildings: National Survey of Asbestos-Containing Friable Materials EPA 560/5-84-006

Asbestos in Buildings: Guidance for Service and Maintenance Personnel EPA 560/5-85-018

Asbestos Waste Management Guidance EPA 530-SW-85-007

Asbestos Fact Book EPA Office of Public Affairs

Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials

Commercial Laboratories with Polarized Light Microscopy Capabilities for Bulk Asbestos Identification.

A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001

Managing Asbestos In Place: A Building Owners Guide to Operations and Maintenance Programs for Asbestos Containing Materials EPA 20T-2003 July 1990

# 1.06 NOTICES:

U.S. Environmental Protection Agency notification to the USEPA is mandated by the National Emission Standards for Hazardous Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M) for any project which involves the removal of asbestos containing materials. The Texas Department of State Health Services requires written notification no less than ten working days prior to any asbestos abatement activity, renovation or O&M activity affecting ACM, or any demolition in facilities or public buildings.

Written notification as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) and the Texas Department of State Health Services shall be submitted by the Contractor to the following address:

Asbestos Notification Section Department of State Health Services PO Box 143538 Austin, Texas 78714-3538

Notification: The following information will be included in the notification sent to the NESHAP contact:

Name and address of owner or operator.

Description of the facility being demolished or renovated, including the size, age, and prior use of the facility.

Estimate of the approximate amount of friable asbestos material present in the facility in terms of linear feet of pipe, and surface area of other facility components.

Location of the facility being renovated.

Scheduled starting and completion dates of renovation.

Nature of planned renovation and method(s) to be used.

Procedures to be used to comply with the requirements of USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M).

Name and location of the waste disposal site where the friable asbestos waste material will be deposited.

Supplement information may be required on the Contractor's part to obtain approval. The Contractor will provide whatever information requested by the regulatory agencies.

#### **1.07 NOTICES:**

Submit notices required by federal, state and local regulations together with proof of timely transmittal to agency requiring the notice.

<u>Permits:</u> All asbestos waste is to be transported by an entity maintaining a current "Industrial Waste Hauler Permit" specifically for asbestos containing materials, as required for transporting of asbestos containing materials to a disposal site.

<u>Licenses:</u> Maintain current State Asbestos Abatement Contractor License or local jurisdiction for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

# PART 2 - PRODUCTS (Not Applicable)

# PART 3 - EXECUTION (Not Applicable)

- END OF SECTION -

#### **WORKER PROTECTION**

# PART 1 - GENERAL

THE MINIMUM RESPIRATORY PROTECTION DURING REMOVAL INSIDE CONTAINMENTS WILL BE POWERED AIR-PURIFYING RESPIRATORS. HALF FACE DUAL CARTRIDGE RESPIRATORS EQUIPPED WITH HEPA/ORGANIC CARTRIDGES CAN BE USED DURING THE REMOVAL OF FLOOR TILE MASTIC IF USING CHEMICAL SOLVENTS. THE CONTRACTOR SHALL PROVIDE INFORMATION TO ASSURE THAT THE ABOVE RESPIRATORY PROTECTION IS SUFFICIENT IN ACCORDANCE WITH 29 CFR 1926.1101 NEGATIVE EXPOSURE ASSESSMENT REQUIREMENTS.

#### 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, and other Division-1 Specification sections, apply to work of this section.

#### 1.02 DESCRIPTION OF WORK:

This section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.

#### 1.03 RELATED WORK SPECIFIED ELSEWHERE:

Respiratory protection is specified in Section 01911.

#### 1.04 WORKER TRAINING:

<u>Train</u>, in accordance with 29 CFR 1926 and 40 CFR part 763, all workers in the dangers inherent in handling asbestos and breathing asbestos dust and in proper work procedures and personal and area protective measures. Include but do not limit the topics covered in part 763 to the following:

Methods of recognizing asbestos.

Health effects associated with asbestos.

Relationship between smoking and asbestos in producing lung cancer.

Nature of operations that could result in exposure to asbestos.

Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:

Engineering controls
Work practices
Respirators
Housekeeping procedures
Hygiene facilities
Protective clothing
Decontamination procedures
Emergency procedures

Waste disposal procedures

Purpose, proper use, fitting, instructions, and limitations of respirators as required by 29 CFR 1910.134.

Appropriate work practices for the work.

Requirements of medical surveillance program.

Review of 29 CFR 1926.

Negative air systems.

Work practices including hands on or on-job training.

Personal decontamination procedures.

Air monitoring, personal and area.

# 1.05 MEDICAL EXAMINATIONS:

<u>Provide medical examinations</u> for all workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an 8 hour time weighted average. In the absence of specific airborne fiber data, provide medical examination for all workers who will enter the work area for any reason. Examination shall, as a minimum, meet OSHA requirements as set forth in 29 CFR 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

#### 1.06 SUBMITTALS:

<u>Before start of work:</u> Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representative action stamp indicating that the submittal is returned for unrestricted use.

<u>State and local License:</u> Submit evidence that all workers have been trained, certified and accredited as required by state or local code or regulation.

<u>Certificate Worker Acknowledgment:</u> Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or enter the work area.

Report from medical examination: Conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the work area. Submit, at a minimum, for each worker the following:

Name and Social Security Number

Physicians written opinion from examining physician including at a minimum the following:

Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.

Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.

Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

Copy of information that was provided to physician in compliance with 29 CFR 1926.

Statement that the worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker.

# **PART 2 - EQUIPMENT**

# 2.01 PROTECTIVE CLOTHING:

<u>Coveralls:</u> Provide disposable full-body coveralls and disposable head covers and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes for all workers in the work area.

<u>Hard Hats:</u> Provide head protectives (hard hats) as required by OSHA for all workers and provide spares for use by Owner. Label hats with same warning labels as used on disposal bags. Require hard hats to be worn at all times that work is in progress that may potentially cause head injury. Provide hard hats of type with plastic strap type suspension. Require hats to remain in the work area throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from work area at the end of the work.

<u>Goggles:</u> Provide eye protectives (goggles) as required by OSHA for all workers involved in scraping, spraying, or any other activity which may potentially cause eye injury.

Gloves: Provide work gloves to all workers and require that they be worn at all times in the work area. Do not remove gloves from work area, dispose of an asbestos contaminated waste at the end of the work.

#### 2.02 ADDITIONAL PROTECTIVE EQUIPMENT:

New/unused respirators, disposable coveralls, head covers, and footwear covers shall be provided by the Contractor for the Owner and other authorized representatives. Provide two (2) respirators and six (6) complete coveralls and, where applicable, six (6) respirator filter changes per day.

# **PART 3 - EXECUTION**

# 3.01 GENERAL:

Provide worker protection as required by the most stringent OSHA and/or EPA standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the work area.

<u>Each time work area is entered</u>, remove all street clothes in the changing room of the personnel decontamination unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

# 3.02 <u>DECONTAMINATION PROCEDURES:</u>

Require all workers to adhere to the following personal decontamination procedures whenever they leave the work area:

Type C Supplied Air or Powered Air-Purifying Respirators: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:

When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

Still wearing respirators, proceed to showers. Showering is <u>mandatory</u>. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

Thoroughly wet body including hair and face. If using a Powered Air-Purifying Respirator (PAPR), hold blower unit above head to keep canisters dry.

With respirator still in place, thoroughly wet body, hair, respirator face piece, and all parts of the respirator except the blower unit and battery pack on a PAPR. Pay particular attention to seal between face and respirator and under straps.

Take a deep breath, hold it and/or exhale slowly, completely wet hair, face, and respirator. While still holding breath, remove respirator and hold it away from face before starting to breath.

Carefully wash facepiece of respirator inside and out.

If using PAPR, shut down in the following sequence, first cap inlets to filter cartridges, then turn off blower unit (this sequence will help keep debris which has collected on the inlet side of filter from dislodging and contaminating the outside of the unit). Thoroughly wash blower unit and hoses. Carefully wash battery pack with wet rag. Be extremely cautious of getting water in battery pack as this will short out and destroy battery.

Shower completely with soap and water.

Rinse thoroughly.

Rinse shower room walls and floor prior to exit.

Proceed from shower to changing room and change into street clothes or into new disposable work items.

<u>Air Purifying-Negative Pressure Respirators:</u> Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area with a half or full face cartridge type respirator:

When exiting area, remove disposable coveralls, disposable headcovers, and disposable footwear covers or boots in the equipment room.

Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator and filters to avoid asbestos fibers while showering. The following procedure is required as a minimum:

Thoroughly wet body from neck down.

Wet hair as thoroughly as possible without wetting the respirator filter if using an air purifying type respirator.

Take a deep breath, hold it and/or exhale slowly, complete wetting of hair, thoroughly wetting face, respirator and filter (air purifying respirator). While still holding breath, remove respirator and hold it away from face before starting to breath.

Dispose of wet filters from air purifying respirator.

Carefully wash facepiece of respirator inside and out.

Shower completely with soap and water.

Rinse thoroughly.

Rinse shower room walls and floor prior to exit.

Proceed from shower to changing room and change into street clothes or into new disposable work items.

Require that workers <u>NOT</u> eat, drink, smoke, chew gum or tobacco in the work area. To eat, chew, drink or smoke, workers shall follow the procedure described above, then dress in street clothes before entering the non-work areas of the building.

#### 3.03 CERTIFICATE OF WORKER'S ACKNOWLEDGEMENT:

Following this section is a Certificate of Worker Training. After each worker has been included in the contractor's Respiratory Protection Program, completed the training program, and medical examination, secure a fully executed copy of this form.

**END OF SECTION -**

#### RESPIRATORY PROTECTION

PART 1 - GENERAL - THE MINIMUM RESPIRATORY PROTECTION DURING REMOVAL WILL BE HALF FACE DUAL CARTRIDGE RESPIRATORS EQUIPPED WITH HEPA CARTRIDGES. THE CONTRACTOR SHALL PROVIDE INFORMATION TO ASSURE THAT THE ABOVE RESPIRATORY PROTECTION IS SUFFICIENT IN ACCORDANCE WITH 29 CFR 1926.1101 NEGATIVE EXPOSURE ASSESSMENT REQUIREMENTS.

#### 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, and other Division-1 Specification sections, apply to work of this section.

#### 1.02 <u>DESCRIPTION OF WORK:</u>

Instruct and train each worker involved in asbestos abatement in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the work area from the start of any operation which may cause airborne asbestos dust until the work area is completely decontaminated. Use respiratory protection appropriate for the dust level encountered in the work place or as required for other toxic or oxygen-deficient situations encountered.

# 1.03 STANDARDS:

Except to the extent that more stringent requirements are written directly into the contract documents, the following regulations and standards have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement.

#### 1.04 SUBMITTALS:

<u>Before start of work</u> submit the following to the Owner's Representative for review. Do not begin work until these submittals are returned with the Owner's Representative's action stamp indicating that the submittal is returned for unrestricted use.

<u>Product Data:</u> Submit manufacturer's product information for each component used, including NIOSH and MSHA Certifications for each component in an assembly and/or for entire assembly.

<u>System Diagram:</u> When a Type "C" supplied air respiratory system is required by the work, submit drawing showing assembly of components into a complete supplied air respiratory system. Include diagram showing location of compressor, filter banks, backup air supply tanks, hose line connections in work area(s), routing of air lines to work area(s) from compressor.

<u>Operating Instruction:</u> Submit complete operating and maintenance instructions for all components and systems as a whole. Submittal is to be in bound manual form suitable for field use.

Respiratory Protection Program: Submit level of respiratory protection intended for each operation required by the project. Submit this information on a "Respiratory Protection Program" form.

<u>Historic Airborne Fiber Data/Negative Initial Exposure Assessment:</u> Submit airborne asbestos fiber count data calculated by an independent air monitoring firm within the last 12 months to substantiate selection of proposed respiratory protection. Data should include Negative Initial Exposure Assessment which means a demonstration by the employer/contractor, which complies with the criteria in the paragraph of this section; 29 CFR 1926.110 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PELs. Data submitted shall include at least the following for each procedure required by the work:

Date of Measurements

**Employees Monitored** 

**Operations Monitored and Control Methods Used** 

Sampling and Analytical Methods Used and Evidence of their Accuracy

Number, Duration, and Results of Samples Taken

# 1.05 AIR QUALITY FOR SUPPLIED AIR RESPIRATORY SYSTEMS:

If at any time, Type "C" supplied air respirator are used or required, provide air used for breathing in Type "C" supplied air respiratory systems that meets or exceeds standards set for C.G.A. Type 1 (Gaseous Air) Grade D.

#### 1.06 <u>ALLOWABLE CONTAMINANTS:</u>

The following table sets for the quantity of any given contaminant allowed according to the referenced standards:

CONTAMINANT	T` Grade D	CGA YPE 1 (Gaseous Air   Grade E   G	·) Grade H	CSA Z180.1
33117 (01117 (1111	Ciddo D	1 01440 2 1 0	7144011	2100.1
Carbon Monoxide, PPM/V	10	10	5	5
Carbon Dioxide, PPM/V	1000	500	.5	500
Condensed Hydrocarbons, (mg/cu meter)	5	5		1
Gaseous Hydrocarbons - As Methane, PPM/V			10	25
Water Vapor - PPM/V Dewpoint Objectionable Odors	(1) -50F None	(1) -50F None None	(1) -50F	27 -63F None
Nitrogen Dioxide, PPM/V		-	0.5	0.2

Nitrous Oxide, PPM/V				5	
Sulfur Dioxide	<u>1927</u>	<del></del> 2	0.5		
Halogenated solvents, PPM/V	<u>2000</u> 20	_	1	_	
Other gaseous contaminants			-	(2)	
Inorganic particles, (mg/cu meter)	-	-	-	1	
Oxygen content (v/v)	19.5 – 2	3.5%			

#### NOTE:

Indicates that the standard shows no limiting characteristics:

- (1) The CGA standards do not call out a specific moisture limit when the ambient temperature is above freezing. However, since a moisture content no greater than a -50 Degrees Fahrenheit dewpoint (66 PPM/V) is necessary for carbon monoxide elimination, the CO limits could not be met unless the air were dried to a -50 Degrees Fahrenheit dewpoint or better.
- (2) Maximum allowable content of tricholotrifluorethane, dichlorodifluoromethane, and chlorodifluoromethane is 2 PPM/V for each. Unlisted contaminants shall not exceed one-tenth of the threshold limit values (TLV's) for chemical substances in workroom air adopted by the American Conference of Governmental Industrial Hygienists (ACGIH).

#### 1.07 DELIVERY:

Deliver replacement parts, etc., not otherwise labeled by NIOSH or MSHA to job site in manufacturer's containers.

#### PART 2 - EQUIPMENT

#### 2.01 AIR PURIFYING RESPIRATORS:

<u>Respirator Bodies:</u> Provide half face or full face type respirators. Equip full face respirators with a nose cup or other anti-fogging device as would be appropriate for use in air temperatures less than 32 degrees Fahrenheit.

<u>Filter Cartridges:</u> Provide, at a minimum, HEPA type filters labeled with NIOSH certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with ANSI Z228.2 (1980). In addition, a chemical cartridge section may be added, if required, for solvents, etc., in use. In this case, provide cartridges that have each section of the combination canister labeled with the appropriate color code and NIOSH certification (P100).

Non-permitted respirators: Do not use single use, disposable or quarter face respirators.

# 2.02 SUPPLIED AIR RESPIRATOR SYSTEMS:

Provide equipment capable of producing air of the quality and volume required by the above reference standards applied to the job site conditions and crew size. Comply with provisions of this specification if more stringent than the governing standard.

<u>Face Piece and Hose:</u> Provide full face piece and hose by same manufacturer that has been certified by NIOSH as an approved Type "C" respirator assembly operating in pressure demand mode with a positive pressure face-piece.

<u>Auxiliary backup system:</u> In atmospheres which contain sufficient oxygen (greater than or equal to 10.5% oxygen) provide a pressure-demand full face piece supplied air respirator equipped with an emergency back up HEPA filter.

<u>Escape air supply:</u> In atmospheres which are oxygen deficient (less than 19.5% oxygen) provide a pressure-demand full face piece supplied air respirator incorporating an auxiliary self-contained breathing apparatus (SCBA) which automatically maintains an uninterrupted air supply in pressure demand mode with a positive pressure face piece.

Backup air supply: Provide a reservoir of compressed air located outside the work area which will automatically maintain a continuous uninterruptable source of air automatically available to each connected face piece and hose assembly in the event of compressor shut-down, contamination of air delivered by compressor, power loss or other failure. Provide sufficient capacity in the back-up air supply to allow a minimum escape time of one-half hour times the number of connections available to the work area. Air requirement at each connection is the air requirement of the respirators in use plus the air requirement of an average sized adult male engaged in moderately strenuous activity.

<u>Warning-device</u>: Provide a warning device that will operate independently of the building's power supply. Locate so that the alarm is clearly audible above the noise level produced by equipment and work procedures in use, in all parts of the work area and at the compressor. Connect alarm to warn of:

Compressor shut down or other fault requiring use of backup air supply, carbon monoxide (CO) levels in excess of 5 PPM/V.

<u>Carbon Monoxide (CO) Monitor:</u> Continuously monitor and record on a strip chart recorder carbon monoxide (CO) levels. Place monitors in the air line between compressor and back-up air supply and between backup air supply and workers. Connect monitors so that they also sound an alarm as specified under "Warning Devices".

<u>Compressor Shut Down:</u> Interconnect monitors, alarms and compressor so that compressor is automatically shut down and the alarms sounded if any of the following occur:

Carbon Monoxide (CO) concentrations exceed 5 PPM/V in the air line between the filter bank and backup air supply.

Compressor temperature exceeds normal operating range.

<u>Compressor Motor:</u> Provide a compressor driven by an electric motor. Do not use a gas or diesel engines to drive compressor. Insure that electrical supply available at the work site is adequate to energize motor.

<u>Compressor Location:</u> Locate compressor outside of building in location that will not impede access to the building, and that will not cause a nuisance by virtue of noise or fumes to occupied portions of the building.

<u>Air Intake:</u> Locate air intake remotely from any source of automobile exhaust or any exhaust from motors or buildings.

After Cooler: Provide an after cooler at entry to filter system which is capable of reducing temperatures to outside ambient air temperatures.

<u>Self Contained Breathing Apparatus (SCBA):</u> Configure system to permit the recharging of 1/2 hour 2260 PSI SCBA cylinders.

#### **PART 3 - EXECUTION**

#### 3.01 GENERAL:

Respiratory Protection Program: Comply with ANSI Z88.2 - 1980 "Practices for Respiratory Protection" and OSHA 29 CFR 1910 and 1926.

Require that respiratory protection be used at all times that there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental.

Require that a respirator be worn by anyone in a work area at all times, regardless of activity, during a period that starts with any operation which could cause airborne dust until the area has been cleared for re-occupancy in accordance with Section 01915.

Regardless of airborne fiber levels: Require that the minimum level of respiratory protection used be powered air-purifying respirators with high efficiency filters for removal work inside containments and half face dual cartridge respirators equipped with organic/high efficiency filters for the removal of floor tile mastic using chemical solvents.

Do not allow the use of single-use, disposable, or quarter-face respirators for any purpose.

# 3.02 FIT TESTING:

<u>Initial Fitting:</u> Provide initial fitting of respiratory protection during a respiratory protection course of training set up and administered by a Certified Industrial Hygienist. Fit types of respirator to be actually worn by each individual. Allow an individual to use only those respirators for which he has been trained and fit.

On a weekly basis, check the fit of each worker's respirator by having irritant smoke blown onto the respirator from a smoke tube in accordance with the fit test procedures outlined in 29 CFR 1910.134 Appendix A.

<u>Upon each wearing:</u> Require that each time an air-purifying respirator is put on that it be checked for fit with a positive and negative pressure fit test in accordance with the manufacturer's instructions or ANSI Z88.2 (1980) and 29 CFR 1910.134.

# 3.03 TYPE OF RESPIRATORY PROTECTION REQUIRED:

<u>Provide respiratory protection</u> as indicated in paragraph below. Where paragraph below does not apply, determine the proper level of protection by dividing the expected or actual airborne fiber count in the work area by the "protection factors" given below. The level of respiratory protection which supplies an airborne fiber level inside the respirator, at the breathing zone of the wearer, at or below the permissible exposure limit (PEL) is the minimum level of protection allowed.

# 3.04 PERMISSIBLE EXPOSURE LIMIT (PEL):

<u>8-Hour Time Weighted Average</u> (TWA) of asbestos fibers to which any worker may be exposed shall not exceed the following.

<u>Fibers:</u> For purposes of this section, fibers are defined as all fibers regardless of composition as counted in the OSHA Reference Method (ORM), NIOSH 7400 procedure, or asbestos fibers of any size as counted using either a scanning or transmission electron microscope.

Time Weighted Average (TWA) - 0.1 fibers/cubic centimeter

Excursion Limit - 1.0 fiber/cubic centimeter over any thirty (30) minute sampling period.

# 3.05 RESPIRATORY PROTECTION FACTOR:

RESPIRATOR TYPE	PROTECTION FACTOR
Air purifying: Negative pressure respirator High efficiency filter Half facepiece	10
Air purifying: Negative pressure respirator High efficiency filter Full facepiece	<b>50</b>
Powered-air purifying (PAPR): Positive pressure respirator High efficiency filter Full facepiece	1000
Powered-air purifying (PAPR): Positive pressure respirator High efficiency filter Half facepiece	50
Type C supplied air: Positive pressure respirator Continuous-flow Half facepiece	50

Type C supplied air: Positive pressure respirator Continuous-flow Full facepiece		1000
Type C supplied air: Positive pressure respirator Pressure demand Half facepiece		50
Type C supplied air: Positive pressure respirator Pressure demand Full facepiece		1000
Type C supplied air: Positive pressure respirator Demand mode Half facepiece		10
Type C supplied air: Positive pressure respirator Demand mode Full facepiece	<b>1</b> 5	50
Self-contained breathing apparatus (SCBA): Demand mode Half facepiece		10
Self-contained breathing apparatus (SCBA): Demand mode Full facepiece		50
Self-contained breathing apparatus (SCBA): Pressure demand Full facepiece		10,000

# 3.06 **AIR PURIFYING RESPIRATORS:**

Negative pressure - half or full face mask: Supply a sufficient quantity of respirator filters approved for asbestos so that workers can change filters during the work day. Require that respirators be wet-rinsed and filters discarded each time a worker leaves the work area. Require that new filters be installed each time a worker re-enters the work area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use.

Powered air purifying - half or full face mask: Supply a sufficient quantity of high efficiency respirator filters approved for asbestos dust so that workers can change filters at any time that flow through the face piece decreases to the level at which the manufacturer recommends filter replacement. Require that regardless of flow, filter cartridges be replaced after 40 hours of use. Require that HEPA elements in filter cartridges be protected from wetting during showering. Require entire exterior housing of respirator including blower unit, filter cartridges, hoses, battery pack, face mask, belt, and cords to be washed each time a worker leaves the work area. Caution should be used to avoid shorting battery pack during washing. Provide an extra battery pack for each respirator so that one can be charging while one is in use.

#### 3.07 TYPE "C" RESPIRATOR:

<u>Air Systems Monitor:</u> Continuously monitor the air system operation including compressor operation, filter system operation, backup air capacity and all warning and monitoring devices at all times that system is in operation. Assign an individual trained, by manufacturer of the equipment in use or by a Certified Industrial Hygienist, in the operation and maintenance of the system to provide this monitoring. Assign no other duties to this individual which will take him away from monitoring the air system.

# 3.08 <u>RESPIRATORY PROTECTION PROGRAM:</u>

Submit a completed "Respiratory Protection Program" form indicating type of respiratory protection proposed for each portion of the work.

- END OF SECTION -

# CERTIFICADO DE CONOCIMIENTO DEL TRABAJADOR: (CERTIFICATE OF WORKER'S ACKNOWLEDGMENT: Spanish Version)

NOMBRE DEL PF	ROJECTO	FECHA
DOMICILIO DEL I	PROJECTO	
NOMBRE DEL CO	ONTRACTISTA	
SIDO ASOCIADO ASBESTOS, LAS	CON VARIOS TIPOS DE CANCER	SO. EL RESPIRAR FIBRAS DE ASBESTOS R. SI TU FUMAS Y RESPIRAS FIBRAS D LAR CANCER EN LOS PULMONES SO
un respirador apro de seguridad y se examinado por u certificado tu est obligaciones (de l chequeo medico). laboratorio de ana	priado y se te enseñe como usarlo. Tu e te enseñe a usar el equipo y herram n medico. Estas cosas deben ser he as asegurando al dueno del projecto proporcionarte equipo adecuado, entre Por lo que se esta de acuerdo en m	projecto requiere que: se te debe proporciona debes ser entrenado para trabajar con medida tienta que se requiere para trabajar. Que se echas sin costo alguno para ti. Al firmar es o que tus patrones ya cumplieron con esta enarte en practicas de seguridad y pasar por unantener al dueño del projecto, sus consejero e ponsabilidad en todas y cada una de las queja.
informado del tipo manual de proteco	de respirador que debe ser usado er	en el use apropiado de respiradores, y he sion este projecto. Yo tengo una copia escrita di patrones. Yo he sido equipado sin costo algurojecto.
asbestos y con e	el respirar polvo de asbestos y he sid fidas de proteccion personales en el a	en los peligros relacionados con el manejo do entrenado en los procedimientos de traba area de trabajo. Los temas vistos en el curs
	Caracteristicas fisicas de asbesto Peligros de salud asociado con a Uso de equipo de proteccion Sistemas de aire negativos Practicas de trabajo mientras se Procedimientos de descontamina Muestreo del aire, personal y del	asbestos trabaja o se entrena acion personal
patrones. Esta e	O: Yo he sido examinado dentro de lo xaminacion incluye: historia de salud, acion de rayos x del torax.	est ultimos 12 meses el cual fue pagado por m pruebas de funcion pulmonares y podria ten
Firma:		
Nombre Escrito:		
Numero Del Segu	ro Social:	
Testino:		

# **WORK AREA CLEARANCE (PCM)**

<u>PART 1 - GENERAL</u>: CLEARANCE AIR SAMPLES WILL BE COLLECTED DOWN WIND AND THE SAMPLES FROM THE WORK AREAS WILL BE ANALYZED USING PCM METHOD.

# 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, and other Division - 1 Specification sections, apply to work of this section.

#### 1.02 CONTRACTOR RELEASE CRITERIA:

The work is complete when the work area is visually clean and airborne fiber levels have been reduced to the level specified below.

#### 1.03 AIR MONITORING:

<u>To determine if the elevated airborne fiber counts</u> encountered during demolition operations have been reduced to the specified level, the Owner's Representative will secure samples and analyze them according to the following procedures.

<u>Fibers Counted</u>: "Fibers" referred to in this section shall be as defined in NIOSH Method 7400, Issue 2.

# 1.04 SAMPLING:

The type of sample to be collected will be determined by the CIH retained by the Owner. In the case of aggressive air sampling, the sampling techniques are as follows:

There are not standards available for flow rate of leaf blowers or large fans. However this information is not critical to the success of the procedure.

Before sampling pumps are started the exhaust from forced air equipment (leaf blower with at least 1 horsepower electric motor) will be swept against the abated area and all surfaces. This procedure will be continued for five (5) minutes per 10,000 cubic feet of room volume.

#### 1.05 SCHEDULE OF AIR SAMPLES:

**GENERAL:** The number and volume of air samples taken and analytical methods used by the Owner will be in accordance with the following schedule. Sample volumes given may vary depending upon the analytical instruments used.

<u>Visual Inspection</u>: Required as a prerequisite of air testing, is set forth in section 01914.

Air Monitoring: Performed by the Owner during abatement work, is described in section 01906.

If results of the first set of air samples show that the Contractor has not achieved clearance level, it is the Contractor's responsibility to perform the additional work required for clearance. In addition, the Contractor will be responsible for all costs involved with any additional air sampling to be performed (cost of analysis and collection).

# PHASE CONTRAST MICROSCOPY (PCM):

LOCATION SAMPLED	NUMBER OF SAMPLES	FILTER MEDIA	L	ECTION IMIT ERS/CC)	MINIMUM VOŁUME (LITERS)	FLOW RATE LPM
Inside Affected Functional Space	5 (minimum)	Mixed Cellu Ester 0.80 Micror		0.01	1500	2-10

<u>Analysis:</u> Fibers on each filter will be measured using PCM procedures in accordance with NIOSH 7400, Issue 2.

Release Criteria: Decontamination of the work site is complete when every work area sample is below or equal to 0.01 f/cc of air sampled or the baseline whichever is higher.

<u>Phase Contract Microscopy:</u> The services of a testing laboratory will be employed by the Owner to perform laboratory analysis of the air samples. A microscope and technician will be set up on site so that verbal results can be obtained immediately. If site conditions dictate that the testing laboratory cannot set up on site, verbal results shall be relayed to the Owner as well as the contractor within four hours of the collection of the clearance samples. A complete record certified by the testing laboratory of all air monitoring tests and results will be furnished to the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

- END OF SECTION -

#### **DISPOSAL OF ASBESTOS-CONTAINING WASTE MATERIAL**

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, and Division-1 Specification sections, apply to work of this section.

#### 1.02 <u>DISPOSAL</u>:

Friable asbestos-containing waste material and debris that is packaged in accordance with the provision of this specification may be disposed of at designated sanitary landfills when certain precautions are taken.

Notice to appropriate Environmental Protection Agency regional office.

Notice and permit from appropriate State and/or local Agencies.

See Section 01904 for agency locations and code.

Dispose of non-friable asbestos containing material in accordance with applicable regulations.

# 1.03 **SUBMITTALS**:

Submit copies of all manifest, including DOT shipping receipts, and landfill site receipts to Owner's Representative within 15 calendar days of project completion.

# PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

#### 3.01 GENERAL:

Carefully load containerized waste on sealed trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.

Do not store disposal bagged material outside of the work area. Take bags from the work area directly to a sealed truck or dumpster. Label containers or bags with the name of the waste generator and the location at which the waste was generated.

Do not transport disposal bagged material on open trucks. The interior of the vehicle where bags are being transported shall be lined with 6 mil thich polyethylene. Double bagged material may be transported on open trucks if they are first loaded in sealed drums. Label drums with the same warning label as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as asbestos-containing waste and dispose of in accordance with the specification.

Advise the sanitary landfill operator at least twenty-four hours in advance of transport of the quantity of material to be delivered.

At the burial site, sealed plastic bags shall be carefully removed from the truck. If bags are broken or damaged in transit, leave in the truck and clean entire truck and contents.

Retain receipts from landfill for material disposed of.

Final payment may be withheld by the Owner until all the properly executed manifests have been submitted to the Owner's Representative.

- END OF SECTION -



# Item No. 104S Removing Portland Cement Concrete

# 104S.1 Description

This item shall govern the demolition, removal and satisfactory disposal of existing Portland cement concrete, as classified, at locations indicated on the Drawings or as directed by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

#### 104S.2 Submittals

The submittal requirements of this specification item may include:

- A. A permit when utility adjustments are made in the right-of-way, and
- B. A plan for removal and deposition of all 'broken up' existing Portland cement (p.c.) concrete materials and debris.

#### 104S.3 Classification

Existing Portland cement concrete, when removed under this section, will be classified as follows:

- 1. Concrete Curb will include curb, curb and gutter and combinations thereof,
- 2. Concrete Slabs will include, but not be limited to, house slabs, patio slabs, porch slabs, concrete riprap and concrete pavement,
- 3. Sidewalks and Driveways will include concrete sidewalks and driveways,
- 4. Concrete Walls will include all walls, regardless of height, and wall footings,
- 5. Concrete Steps will include all steps and combinations of walls and steps,
- 6. Abandoned Foundations will include abandoned utility foundations,
- 7. Miscellaneous Concrete shall include all other concrete items, which are not identified in items 1 through 6 above.

#### 104S.4 Materials

Mortar shall conform to mortar specified in Standard Specification Item No. 403S, "Concrete for Structures".

#### 104S.5 Construction Methods

Prior to commencement of this work, all required erosion control and tree protection measures shall be in place. The existing utilities shall be located and protected as specified in the Standard Contract Documents, Section 00700, "General Conditions". A permit shall be required when utility adjustments are to be made in preparation for

104S 09/26/12 Page 1 Removing Concrete

highway construction, as specified in Section 5.2.0 of the City of Austin Utilities Criteria Manual.

The existing Portland cement concrete shall be broken up, removed in accordance with Item No. 101S, "Preparing Right of Way" and disposed of by the Contractor and deposited at a permitted disposal site.

When it is specified that only a portion of the existing Portland cement (p.c.) concrete is to be removed and that the remaining p.c. concrete will continue to serve its purpose, special care shall be exercised to avoid damage to that portion which will remain in place. Unless otherwise established by the Engineer or designated representative, existing p.c. concrete shall be cut to the neat lines, that are indicated on the Drawings, by sawing with an appropriate type circular type circular concrete saw to a minimum depth of 1/2 inch (12.5 mm). Any reinforcing steel encountered shall be cut off 1 inch (25 mm) inside of p.c. concrete sawed line. Any existing p.c. concrete, which is damaged or destroyed beyond the neat lines so established, shall be replaced at the Contractor's expense. Remaining p.c. concrete shall be mortared to protect the reinforcing steel and provide a neat clean appearance.

When reinforcement is encountered during the removal of portions of existing structures to be modified, a minimum of 1 foot (300 mm) of steel length shall be cleaned of all old p.c. concrete and left in place to tie into the new construction where applicable. All unsuitable material shall be removed and replaced with approved material. All foundations, walls or other objectionable material shall be removed to a minimum depth of 18 inches (450 mm) below all structures and 12 inches (300 mm) below areas to be vegetated.

#### 104S.6 Measurement

When included in the contract as a separate pay item, the removal of p.c. concrete curb and p.c. concrete wall as prescribed above will be measured by the lineal foot (meter: 1 meter is equal to 3.281 feet) in its original position regardless of the dimensions or size. The removal of p.c. concrete slabs, p.c. concrete sidewalks and driveways, as prescribed above, will be measured by the square foot (square meter: 1 square meter is equal to 10.764 square feet) in original position, regardless of the thickness and existence of reinforcing steel. Portland cement concrete steps removed will be measured per lineal foot (meter: 1 meter is equal to 3.281 feet) of each individual step tread including the bottom step. The removal of p.c. concrete foundations will be measured per lump sum.

### 104S.7 Payment

The work and materials presented herein will generally not be paid for directly, but shall be included in the unit price bid for the item of construction in which this item is used.

When specified in the contract bid form as a separate pay item, the item will be paid for at the contract unit bid price(s) for "Remove P.C. Concrete Curb", "Remove P.C. Concrete Slab", "Remove P.C. Concrete Sidewalks and Driveways", "Remove P.C. Concrete Walls", "Remove P.C. Concrete Steps", "Remove P.C. Concrete Foundations" and "Remove Miscellaneous P.C. Concrete". The bid prices shall include full compensation for all Work herein specified, including the disposal of all material not required in the

Work, the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the Work.

Payment will be made under one of the following:

Pay Item No. 104S-A:Remove P.C. Concrete CurbPer Lineal foot.Pay Item No. 104S-B:Remove P.C. Concrete SlabPer Square foot.

Pay Item No. 104S-C: Remove P.C. Concrete Sidewalks and Driveways

Per Square foot

Pay Item No. 104S-D:Remove P.C. Concrete WallPer Lineal foot.Pay Item No. 104S-E:Remove P.C. Concrete StepsPer Lineal foot.Pay Item No. 104S-F:Remove P.C. Concrete FoundationsPer Each.Pay Item No. 104S-G:Remove Miscellaneous P.C. ConcretePer Lump Sum.

#### End

## **SPECIFIC** CROSS REFERENCE MATERIALS

Specification Item 104S, "REMOVING CONCRETE"

#### City of Austin Standard Contract Documents

<u>Designation</u> <u>Description</u>

00700 General Conditions

## City of Austin Utilities Criteria Manual Designation Description

Section 5.2.0 Permit for Excavation in the Public Right-of-Way

## <u>City of Austin</u> Standard <u>Specifications</u> <u>Designation</u> <u>Description</u>

Item No. 101S Preparing Right of Way

Item No. 110S Street Excavation

Item No. 111S Excavation

Item No. 120S Channel Excavation

Item No. 132S Embankment

Item No. 403S Concrete for Structures

Item No. 610S Preservation of Trees and Other Vegetation

## **RELATED** CROSS REFERENCE MATERIALS

### City of Austin Standard Contract Documents

<u>Designation</u> <u>Description</u>

01500 Temporary Facilities

01550 Public Safety and Convenience

### The Code of the City of Austin, Code of Ordinances, Volume 1

<u>Designation</u>
Article 14-11-181

<u>Description</u>
Permit Required

Article 14-11-189 Conditions for Permit Issuance

Article 14-11-190 Excavation Sequence and Permit Term

## City of Austin Standard Specifications

Designation Description

Item No. 201S Subgrade Preparation

Item No. 602S Sodding for Erosion Control Item No. 604S Seeding for Erosion Control

Item No. 622S **Diversion Dike** 

Sediment Containment Dikes Item No. 628S

Item No. 642S Silt Fence

## **RELATED** CROSS REFERENCE MATERIALS - Continued Specification Item 104S "REMOVING CONCRETE"

Specification Item 104S, "REMOVING CONCRETE"				
City of Austin Standard Details				
Designation	Description			
610S-1	Tree Protection Fence Locations			
610S-2	Tree Protection Fence, Type B Chainlink			
610S-3	Tree Protection Fence, Type B Wood			
610S-4	Tree Protection Fence, Modified Type A			
610S-5	Tree Protection Fence, Modified Type B			
621S-1	Diversion			
622S-1	Diversion Dike			
624S-1	Earth Outlet Sediment Trap			
625S-1	Grade Stabilization Structure			
627S-1	Grass Lined Swale			
627S-2	Grass Lined Swale With Stone Center			
628S	Triangular Sediment Filter Dike			
628S-1	Hay Bale Dike			
629S-1	Brush Berm			
630S-1	Interceptor Dike			
631S-1	Interceptor Swale			
632S-1	Storm Inlet Sediment Trap			
633S-1	Landgrading			
634S-1	Level Spreader			
635S-1	Perimeter Dike			
636S-1	Perimeter Swale			
637S-1	Pipe Slope Drain (Flexible)			
637S-2	Pipe Slope Drain (Flexible)			
638S-1	Pipe Outlet Sediment Trap			
639S-1	Rock Berm			
641S-1	Stabilized Construction Entrance			
642S-1	Silt Fence			
643S-1	Stone Outlet Structure			

## Texas Department of Transportation: Standard Specifications for Construction

Stone Outlet Sediment Trap

and Maintenance of Highways, Streets, and Bridges

644S-1

<u>Designation</u>	<u>Description</u>
Item No. 100	Preparing Right of Way
Item No. 104	Removing Concrete
Item No. 110	Excavation
Item No. 112	Subgrade Widening
Item No. 132	Embankment
Item No. 158	Specialized Excavation Work
Item No. 420	Concrete Structures

# Item No. 315S Milling Asphaltic Concrete Pavement and Non-Portland Cement Concrete Bases

## 315S.1 Description

This item shall govern for the planing or the planing and texturing of existing asphaltic concrete pavement, asphalt stabilized and other non Portland cement Concrete base to depths indicated at the locations shown on the Drawings or as directed by the Engineer or designated representative. The item shall also include removal, and disposal or salvage/stockpiling the milled materials at the locations designated by the Engineer or designated representative.

When shown on the Drawings, the salvaged asphaltic concrete pavement and/or stabilized base, including any accompanying surface treatment, plant mix seal and micro-surfacing, may be allowed or required for use in other construction items of this project

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 315S.2 Submittals

The submittal requirements of this specification item include:

- A. Characteristics (i.e. manufacturer, power, stability, speed, etc.) and capabilities (depth of cut, dust control, etc.) of the proposed milling equipment.
- B. Proposed plan for grade reference, control point spacing and support system.
- C. Proposed dust control plans including proposed equipment (type street sweeper, loader, water trucks, sprayers, etc.).

## 315S.3 Equipment

The equipment for removing the pavement surface shall be a power operated planing machine or grinder with a minimum 2 feet (1.8 meter) cutting width. For detail work and cutting widths less than 2 feet (1.8 meter), equipment with less than 2 feet (1.8 meter) cutting width shall be allowed. The equipment shall be self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope. The equipment shall be capable of removing in one pass, asphaltic concrete pavement of a thickness of 1 inch and any required thickness less than 1 inch (25 millimeters) in a minimum 3 foot (0.9 meters) width. Machines capable of removing, in one pass, a depth greater than 1 inch (25 millimeters) will be permitted.

The grade reference used by the Contractor may be of any type approved by the Engineer or designated representative. Control points, if required by the Drawings, shall be set at intervals not to exceed 50 feet (15 meters). The Contractor shall set the grade reference from the control points. The grade reference shall have sufficient support so that the maximum deflection shall not exceed two millimeters (1/16 inch) between supports.

The machine shall have a manual system providing for uniformly varying the depth of cut while the machine is in motion, thereby making it possible to cut flush to all inlets, manholes, or other obstructions within the paved area. The speed of the machine shall be variable in order to leave the desired grid pattern as specified in sections 315S.4 and 315S.5.

The machine shall be equipped with an integral loading and reclaiming means to immediately remove material being cut from the surface of the roadway and discharge the cuttings into a truck, all in one operation. The machine shall be equipped with means to control dust created by the cutting action. Adequate backup equipment (mechanical street sweepers, loaders, water truck, sprayers, brooms etc.) and personnel will also be provided to keep flying dust to a minimum and to insure that all cuttings are removed from the street surface daily. Stockpiling of planed material will not be permitted on the project site.

Various machines may be permitted to make trial runs to demonstrate the capabilities of that machine and to determine the acceptability of that machine to the Engineer or designated representative. Any machine that is incapable, in the opinion of the Engineer or designated representative, of meeting these requirements will not be permitted.

#### 315S.4 Construction Methods

#### A. General.

The pavement surface shall be removed for the length, depth and width and to the typical section shown on the Drawings, and to the lines and grades established by the Engineer or designated representative. The planed surface shall provide a satisfactory riding surface free from gouges, continuous longitudinal grooves, ridges, oil film and other imperfections and shall have a uniform textured appearance.

When an existing asphaltic concrete pavement overlay is to be removed from an underlying Portland cement concrete pavement, all of the asphaltic concrete pavement shall be removed, leaving a uniform surface of Portland cement concrete, unless otherwise directed by the Engineer or designated representative.

#### B. Surface Milling.

Surface milling shall be taken to a minimum depth of 2 inches (50 mm) or deeper as may be dictated by delamination of asphalt layers during the milling operation, to a depth of 1 inch (25 millimeters) below the lip gutter transitioning to the existing surface in 3 feet (0.9 meter) or as indicated on the Drawings for resurfacing operations. The pavement surface shall be removed to the appropriate milling depths around all castings within the area to be milled. When milling is used for leveling without the addition of asphalt, the milled surface shall be free of ridges deeper than 3/16 inch (5 millimeters).

Pavement, which is adjacent to steep curbs, inlets, manholes or other obstructions and that is not removed by the planing machine, shall be removed by other methods, acceptable to the Engineer or designated representative.

The pavement and curb surfaces shall be swept with a street sweeper or other sweeping equipment approved by the Engineer or designated representative to remove all debris leaving a clean and presentable condition.

#### C. Edge Milling.

Edge milling at the gutter lip shall be taken to a minimum depth of 1/4 inch (6 mm) less than the overlay thickness and shall transition to the existing surface in a minimum of 6 feet (1.8 meters).

#### D. Spot Milling.

Milling for spot repairs shall be completed in successive passes to the depth specified. Ramping for spot repairs shall be minimized. "Transition milling required at the beginning and ending of the overlay shall be taken to a minimum depth of the overlay thickness and transition to the existing surface for the length specified in the plans.

#### E. Miscellaneous.

Unless otherwise specified, the milling material shall remain the property of the Contractor. Temporary stockpiling shall not be permitted on site. Temporary pavement markings shall conform to Item No. 864S, "Abbreviated Pavement Markings".

## 315S.5 Surface Texture (Temporary Traffic Only)

In those areas where traffic will temporarily be permitted, the texture produced shall be a grid pattern or any other pattern with discontinuous longitudinal striations that will provide, in the opinion of the Engineer, a satisfactory riding surface.

When the planed pavement will not be overlaid, the minimum texture depth resulting from the number of measurements directed by the Engineer shall not be less than 3/64 inch (1.25 millimeters), unless specified otherwise on the Drawings. When these texture requirements are not met, the Contractor shall cease operations until the Engineer is satisfied that changes in the texturing procedures will produce an acceptable texture.

The Contractor shall take care to prevent damage to armor joints, sealed expansion joints and/or other appurtenances.

The surface of the pavement, after planing, shall have a smooth riding quality and shall be true to the established line, grade and cross section.

#### 315S.6 Measurement

Work prescribed by this item will be measured by the square yard (square meter: 1 square meter equals 1.196 square yards) of surface area for actual quantities based on the neat dimensions indicated for surface and transition milling, spot repairs and edge milling to the specified width. Ramping for spot repairs shall not be measured for payment. Surface milling for spot repairs shall be included in the unit price bid for the spot milling area measured.

Measurement will be made only one time regardless of the number of passes required by the machine to secure the depth desired.

### 315S.7 Payment

The work performed in accordance with this item and measured as provided under "Measurement", will be paid for at the unit bid price per square yard for "Milling Asphaltic Concrete Paving and Non-Portland Cement Bases". The price shall include full compensation for removal of all materials to the depth shown; minimizing the dust escaping to the atmosphere; loading, hauling, unloading and satisfactorily storing or disposing of the material; and for all labor, tools, equipment, manipulation, temporary pavement markings and incidentals to complete the work, including mobilization of the milling machine.

No payment will be made for work done by any machine on a trial run to demonstrate its ability to meet this specification unless the work performed is acceptable under this specification.

Payment will be made under the following:

Pay Item No. 315S-A:	Surface Milling	Per Square Yard.
Pay Item No. 315S-B:	Profile Milling	Per Square Yard.
Pay Item No. 315S-C:	Transition Milling	Per Square Yard.
Pay Item No. 315S-D:	Edge Milling	Per Square Yard.
Pay Item No. 315S-E:	Spot Milling	Per Square Yard.

## End

SPECIFIC CROSS REFERENCE MATERIALS	
Specification Item 315S "Milling Asphaltic Concrete"	1

## City of Austin Standard Specifications

<u>Designation</u>	<b>Description</b>
Item No. 642S	Silt Fence (SF)

Item No. 864S Abbreviated Pavement Markings

#### **RELATED** CROSS REFERENCE MATERIALS

#### City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 206S	Asphalt Stabilized Base
Item No. 210S	Flexible Base
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 306S	Prime Coat
Item No. 307S	Tack Coat
Item No. 310S	Emulsified Asphalt Treatment
Item No. 311S	Emulsified Asphalt Repaving
Item No. 312S	Seal Coat
Item No. 320S	Two Course Surface Treatment
Item No. 340S	Hot Mix Asphaltic Concrete Pavement
Item No. 341S	Paving Fabric
Item No. 350S	Heating, Scarifying and Repaving

Milling Asphaltic Concrete Pavement and Non-Portland Cement Concrete Bases Item No. 351S Recycling Agent

## **RELATED** CROSS REFERENCE MATERIALS (Continued)

Specification Item 315S "Milling Asphaltic Concrete"

## City of Austin Standard Details

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<u>Designatio</u> n	<u>Description</u>
1000S-10	Local Street Sections
1000S-11(1)	Residential and Neighborhood collector Street Sections
1000S-11(2)	Industrial and Collector Street Sections
1000S-12(1)	Primary Collector Street Sections
1000S-12(2)	Primary Arterial Street Sections
1000S-13(1)	Minor Arterial Street Sections (4 Lanes)
1000S-13(2)	Minor Arterial Street Sections- (4 Lanes divided)
1000S-14	Major Arterial Street

Texas Department of Transportation: Standard Specifications for Construction

And Maintenance of Highways, Streets, and Bridges				
<u>Designation</u>	<u>Description</u>			
Item 300	Asphalts, Oils and Emulsions			
Item 301	Asphalt Antistripping Agents			
Item 310	Prime Coat (Cutback Asphaltic Materials)			
Item 314	Emulsified Asphalt Treatment			
Item 345	Asphalt Stabilized Base (Plant Mixed)			
Item 354	Planing and/or Texturing Pavement			

## Item No. 340S Hot Mix Asphaltic Concrete Pavement

#### 340S.1 Description

This item shall govern base, level up, and pavement surface courses composed of a compacted mixture of aggregate and asphaltic cement mixed hot in a mixing plant. The hot mix asphaltic (HMA) concrete pavement shall be constructed on a previously completed and approved subgrade, subbase material, base material, concrete slab or existing pavement.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 340S.2 Submittals

The submittal requirements of this specification item may include:

- A. A mix design submittal including the plant corrected Job Mix Formula (JMF) for the hot mix asphaltic concrete,
- B. Certification that the aggregate materials meet appropriate quality requirements.
- C. Particle-size gradation and specific gravity tests on all aggregate materials.
- D. Certification that the asphalt cement for paving materials meet appropriate quality requirements.

#### 340S.3 Materials

The Contractor shall furnish materials to meet the requirements specified herein and shall be solely responsible for the quality and consistency of the product delivered to the Project.

A. Aggregate: The aggregate shall be composed of coarse aggregate, a fine aggregate and, if required or allowed, mineral filler and reclaimed asphalt pavement (RAP). RAP use will be allowed in all base course mixtures except as specifically excluded herein, in the Contract Documents or on the Drawings, provided no more than 20% RAP is used.

RAP use will not be permitted in pavement surface courses.

Aggregates shall meet the quality requirements of Table 1 and other requirements as specified herein. The aggregate contained in RAP will not be required to meet Table 1 requirements unless indicated otherwise on the Drawings.

- 1. Coarse Aggregate: Coarse aggregate is defined as that part of the aggregate retained on the No. 10 (2.00 mm) sieve and shall consist of clean, tough, durable fragments of crushed stone or crushed gravel of uniform quality throughout.
  - Gravel from each source shall be crushed to the extent that it has a minimum of 85% of the particles retained on the No. 4 (4.75 mm) sieve with two or more mechanically induced crushed faces as determined by TxDOT Test Method TEX-460-A (Part I). The material passing the No. 4 (4.75 mm) sieve and retained on the No. 10 (2.00 mm) sieve must be the produced from crushing aggregate that was originally retained on the No. 4 (4.75 mm) sieve.
- 2. Reclaimed Asphalt Pavement (RAP): RAP is defined as a salvaged, milled, pulverized, broken or crushed asphaltic pavement. The RAP to be used in the mix shall be crushed or broken to the extent that 100 percent will pass the 2-inch (50 mm) sieve.

The RAP shall be stockpiled in such a manner that assures that it will not become contaminated by dirt or other objectionable materials. Unless indicated otherwise on the Drawings, stockpiled, crushed RAP must not exhibit a decantation more than 5 percent or a plasticity index more than 8, when tested in accordance with TxDOT Test Method Tex-406-A, Part I, or Test Method Tex-106-E, respectively.

3. Fine Aggregate: Fine aggregate is defined as that part of the aggregate passing the No. 10 (2.00 mm) sieve and shall be of uniform quality throughout. A maximum of 15 percent of the total aggregate may be field sand or other uncrushed fine aggregate.

Screenings shall be supplied from sources whose coarse aggregate meets the abrasion and magnesium sulfate soundness loss requirements shown in Table 1.

a) Unless indicated otherwise on the Drawings, stone screenings, which are the product of a rock crushing operation, are required and shall meet the following gradation requirements when tested in accordance with TxDOT Test Method Tex-200-F, Part I.

Material	Percent by Weight (Mass)
Passing 3/8 inch (9.50	mm) sieve100
Passing No. 10 (2.00	mm) sieve70-100
Passing No. 200 (75	μm) sieve0-15

- b) Crushed gravel screenings may be used with, or in lieu of, stone screenings only when indicated on the Drawings. Crushed gravel screenings must be the product of crushing aggregate that was originally retained on the No. 4 (4.75 mm) sieve and must meet the gradation for stone screenings shown above.
- 4) Mineral Filler: Mineral filler shall consist of thoroughly dried stone dust, Portland cement, fly ash, lime or other mineral dust approved by the Engineer or designated representative. The mineral filler shall be free from foreign matter.

Portland cement manufactured in a cement kiln fueled by hazardous waste shall be considered as an approved product if the production facility is authorized to operate under regulation of the Texas Natural Resource Conservation Commission (TNRCC) and the U. S. Environmental Protection Agency (EPA). Supplier shall provide current TNRCC and EPA authorizations to operate the facility.

Fly ash obtained from a source using a process fueled by hazardous waste shall be considered as an approved product if the production facility is authorized to operate under regulation of the Texas Natural Resource Conservation Commission (TNRCC) and the U. S. Environmental Protection Agency (EPA). Supplier shall provide current TNRCC and EPA authorizations to operate the facility.

The addition of baghouse fines or other collected fines will be permitted if the mixture quality is not adversely affected in the opinion of the Engineer or designated representative. In no case shall the amount of material passing the No. 200 (75  $\mu$ m) sieve exceed the tolerances of the job-mix formula or the master gradation limits.

When tested by TEX-200-F (Part I or Part III, as applicable), the mineral filler shall meet the following gradation requirements. Baghouse fines are not required to meet the gradation requirements.

Material	Percent by Weight (mass)
Passing No. 30 (600 µm) Sieve	95 - 100
Passing No. 80 (187.5 µm) Sieve, not less t	than75
Passing No. 200 (75 µm) Sieve, not less that	an 55

TABLE 1: AGGREGATE QUALITY REQUIREMENTS \*

Requirement	Test Method	Amount			
COARSE AGGREGATE					
Deleterious Material, percent, maximum	Tex-217-F, I	1.5			
Decantation, percent, maximum	Tex-217-F, II	1.5			
Los Angeles Abrasion, percent, maximum	Tex-410-A	40			
Magnesium Sulfate Soundness Loss	Tex-410-A	30			
5 cycle, percent, maximum					
FINE AGGREGATE					
Linear Shrinkage, maximum	Tex-107-E, II	3			
COMBINED AGGREGATES					
Sand Equivalent Value, minimum	Tex-203-F	45			

<sup>\* -</sup> Aggregates, without added mineral filler or additives, combined as used in the job-mix formula (Plant Corrected).

#### B. Asphaltic Material

- Paving Mixture. Asphalt cement for the paving mixture shall conform to the requirements of Standard Specification Item No. 301S, "Asphalts, Oils and Emulsions", for AC-20 or PG64-22, Styrene (SBS) Modified Asphalt Cement, AC-SBS Blend AC-45P or PG76-22S, unless otherwise indicated in the Project Documents.
- 2. Tack Coat: Tack Coat shall conform to Standard Specification Item No. 307S, "Tack Coat".
- C. Additives: Additives to facilitate mixing and/or improve the quality of the asphaltic mixture or tack coat may be used with the authorization of the Engineer or designated representative. The Contractor may choose to use either lime or a liquid anti-stripping agent to reduce moisture susceptibility of the aggregate.

#### 340S.4 Paving Mixtures

An asphalt mixture design is developed by a laboratory process, which includes the determination of the quality and quantity of the asphalt cement and the individual aggregates, and the testing of the combined mixture (Laboratory Design). The Laboratory Design is subsequently revised to produce an appropriate job mix formula.

The job mix formula (JMF) lists the quantity of each component to be used in the mix after the laboratory design has been adjusted by running it through a particular plant (i.e. the mix design is Plant Corrected). The JMF will be the standard to which the Acceptance Plan will be applied. The JMF of one drum or batching unit shall not be used for another unit.

The Contractor shall submit to the Engineer on forms provided by the Engineer or designated representative, an asphalt mixture design reviewed, signed and sealed by a Registered Professional Engineer licensed in the State of Texas or certified by a TxDOT Level II Certified

Asphalt Technician. An asphalt mixture design shall be submitted for a comprehensive review every two (2) years. Mix designs older than one year will not be accepted without a review of current test data of the proposed materials and current mix design to ensure that the materials meet specification requirements.

The JMF (Plant Corrected) shall be submitted to the Engineer or designated representative on a form provided by the Engineer through the Construction Inspector or Project Manager of the Project for review, for each individual Project, a minimum of three (3) working days before the mixture is to be placed. Under no circumstances will a mixture be placed before its use is reviewed and approved by the Engineer or designated representative.

Performance of the mix design shall remain the responsibility of the Contractor.

- A. Mixture Design: The mix shall be designed in accordance with TxDOT Construction Bulletin C-14 and Test Method Tex-204-F to conform with the requirements herein. The master grading limits of the appropriate type and the JMF will be plotted on a graduated chart with sieve sizes raised to the 0.45 power and will be submitted to the Engineer or designated representative with the asphalt mixture design.
  - The Bulk Specific Gravity of aggregates in RAP will be determined on extracted aggregates.
- B. Types: The blend of coarse aggregate, fine aggregate, and mineral filler, if allowed, that is established by TxDOT Test Method Tex-200-F, Dry Sieve Analysis, shall conform to the master gradation shown in Table 2 for the type of specified mixture. The voids in the mineral aggregate (VMA) will be determined as a mixture design requirement only, in accordance with TxDOT Test Method Tex-207-F, and shall not be less than the value indicated in Table 2.

TABLE 2: Master Grading - Percent Passing by Weight (Mass) or Volume

	ve Size	Type A	Type B	Type C	Type D	Type F
	JS (SI)	Coarse Base	Fine Base	Coarse Surface	Fine Surface	Fine Mixture
1-1/2"	(37.5 mm)	100				
1-1/4""	(31 mm)	95-100				
1"	(25 mm)		100			
7/8"	(22 mm)	70-90	95-100	100		
5/8	(15.5 mm)"		75-95	95-100		
1/2"	(12.5 mm)	50-70			100	
3/8"	(9.5 mm)		60-80	70-85	85-100	100
1/4"	(6.25 mm)					95-100
No. 4	(4.75 mm)	30-50	40-60	43-63	50-70	
No. 10	(2.00 mm)	20-34	27-40	30-40	32-42	32-42
No. 40	(425 µm)	5-20	10-25	10-25	11-26	9-24
No. 80	(187.5 µm)	2-12	3-13	3-13	4-14	3-13
No. 200	(75 µm)	1-6*	1-6*	1-6*	1-6*	1-6*
VMA %	minimum	11	12	13	14	15
Rec. M	1in. Lift	3" (75 mm)	2" (50 mm)	1-3/4" (45 mm)	1" (25 mm)	3/4" (20 mm)

C. Tolerances: Fluctuations in the aggregate gradation and asphalt content of the Job Mix Formula (JMF) shall not vary by more than the following criteria but the aggregate gradation shall be limited to the range of the master gradation as established by TEX-210-F.

SIEVES	Percent By Weight (Mass)
2" " (50 mm) Sieve through No. 10 " (2.00 mm) Sieve	±5.0
No. 40 (425 μm) through No. 200 (75 μm) Sieve	± 3.0
Asphalt Content	±0.5

D. Stability and Density: The mixture shall be designed at or near optimum density, as indicated on the Drawings, to conform to the following percent of Maximum Theoretical Density as measured by TxDOT Test Method TEX-227-F and Stability conforming to TxDOT Test Method TEX-208-F. The laboratory mixture shall be molded in accordance with TxDOT Test Method TEX-206-F and the Bulk Specific Gravity determined in accordance with TxDOT Test Method TEX-207-F.

	Optimum Laboratory Density (%)		ratory ity (%) Max.	Stability
Local Streets Surface Courses Collectors & Arterials Surface Courses	96 96	94.5 94.5	97.5 97.5	35 Min. 40-60
All Base Courses	96	94.5	97.5	35 Min.

E. Job Mix Formula Field Adjustments: The Contractor shall produce a mixture of uniform composition closely conforming to the reviewed JMF, that falls within the limits of the tolerances given above and the Acceptance Plan.

If it is determined by the City of Austin that adjustments to the JMF are necessary to achieve the specified requirements, the Engineer or designated representative may allow adjustments of the JMF within the following limits without a laboratory redesign of the mixture. The adjusted JMF shall not exceed the master grading criteria for the type of mixture specified. The proposed JMF adjustments shall not exceed 5 percent on any one sieve, ½-inch (12.5 mm) size and larger, or 3 percent on the sieve size below the 1/2-inch (12.5 mm) sieve of the JMF (Plant Corrected) reviewed for the Project.

When the proposed adjustments exceed either the 5 or 3 percent limits, and the Engineer or designated representative determines that the impact of these changes may adversely affect pavement performance, a new laboratory mixture design will be required.

The asphalt content may be adjusted with the concurrence of the Engineer or designated representative to maintain desirable laboratory density near the optimum value while achieving other mix requirements. However, increasing the asphalt content of the mixture in order to reduce pavement air voids will not be allowed. Also, if the percent air voids is determined to be less than 4 percent, adjustments shall be made to the plant production by the Contractor, within the tolerances as outlined above, so that an adequate air void level is attained.

#### 340S.5 Equipment

The trucks that deliver the hot mix asphalt concrete material to the project shall be of sufficient number to insure a continuous paving operation. All equipment used for the production, placement and compaction of the mixture shall be maintained in good repair and operating

conditions to the satisfaction of the Engineer or designated representative. All equipment shall be made available for inspection. If the Engineer or designated representative expresses concern about the condition of any equipment, it shall not be used until it is repaired to the satisfaction of the Engineer or designated representative.

- A. Mixing Plants: Plants may be of the weigh-batch type, the modified weigh-batch type or drum-mix type equipped with suitable material conveyers, power units, mixing equipment, aggregate proportioning devices, dryers, bins, dust collectors and sensing and recording devices as appropriate for the mixing plant type. The mixing plants shall meet the requirements specified in Section 340.4, 'Equipment' of TxDOT Specification Item No. 340, "Hot Mix Asphaltic Concrete Pavement".
- B. Spreading and Finishing Paving Machine: The paving machine shall be self-propelled and equipped with a heated compacting screed capable of producing a finish surface meeting the requirements of the street cross-section indicated on the Drawings and all surface criteria. Extensions to the screed shall have the same heating and compacting capabilities as the primary unit, except for use on variable depth tapered areas and/or as approved by the Engineer or designated representative.

The paving machine shall be equipped with an approved automatic dual longitudinal screed control system and an automatic transverse screed control system. The longitudinal controls shall be capable of operating from any longitudinal grade reference including a string line, ski, mobile string line or matching shoe. Unless indicated otherwise on the Drawings, the Contractor may use any one of these grade references. The selected grade reference equipment shall be maintained in good operating condition by personnel trained in the use of the specific type of equipment.

The Contractor shall furnish all labor and equipment required for establishing and maintaining appropriate grade reference.

- C. Rollers: The Contractor shall select rollers conforming to Item 230S, "Rolling (Flat Wheel)" and Item 232S, "Rolling (Pneumatic Tire)". Rollers that do not conform to these requirements shall be immediately removed from the Project.
- D. Motor Grader: A self-propelled power motor grader may only be used, when its use is approved by the Engineer or designated representative. It shall have a blade of not less than 12 feet (3.66 meters) and a wheelbase of not less than 16 feet (4.88 meters). Smaller graders may be used for small irregular areas when approved by the Engineer or designated representative.
- E. Material Transfer Equipment: Equipment for transferring the HMA mixture from the hauling units or the roadbed to the spreading and finishing machine will be allowed unless indicated otherwise on the Drawings.
  - Windrow pick-up equipment, if permitted by the Engineer or designated representative, shall be constructed in such a manner that substantially all of the HMA mixture deposited on the roadbed is picked up and loaded into the spreading and finishing machine. The HMA mixture shall not be contaminated with foreign material. The loading equipment shall be designed so that it does not interfere with the spreading and finishing machine in obtaining the required line, grade and surface without resorting to hand finishing.
- F. Straightedges and Templates: The Contractor shall provide a ten-foot (3.05 meter) straightedge acceptable to the Engineer or designated representative for surface testing. Satisfactory templates shall be provided as required by the Engineer or designated representative.

#### 340S.6 Stockpiling Aggregates

Aggregates shall be stockpiled to facilitate blending. When the aggregate is not stockpiled on a hard, non-contaminant base, the bottom six-inch (150 mm) depth of the stockpiles shall not be used in asphaltic mixtures. Where space is limited at the plant site, the aggregate stockpiles shall be separated by walls or other appropriate barriers.

Aggregates shall be stockpiled and handled in a manner that will insure minimization of segregation and contamination. Aggregate and RAP stockpiles shall only contain material from a single source.

## 340S.7 Mixture Temperature

The Contractor shall select a target temperature for discharge of the HMA mixture from the mixer between 250°F (120°C) and 350°F (176°C) that is suitable to weather and Project conditions. The target temperature shall be reported to the Engineer or designated representative daily and recorded in the Daily Progress Report. The HMA mixture temperature shall not vary by more than 25°F (14°C) from the target temperature for discharge from the mixer. HMA mixtures that are discharged from the mixer at a temperature exceeding 360°F (182°C) or a temperature more than 50°F (28°C) below the target temperature shall not be accepted and shall not be placed on the Project.

#### 340S.8 Mixture Storage

A surge-storage system may be used to minimize production interruptions during a normal day of operation. When approved by the Engineer or designated representative, overnight storage of HMA mixture in insulated storage bins may be used provided that material temperature and physical properties of the HMA mixture are not adversely affected. HMA mixtures that include hardened lumps shall not be used. Stored HMA mixtures shall not be exempt from any requirements provided in this specification.

When a surge-storage system is used, it shall be equipped with a device such as a gob hopper or other device approved by the Engineer or designated representative to prevent segregation in the surge-storage bin.

#### **340S.9 Mixture Moisture Content**

Hot mix asphalt (HMA) mixtures produced from any plant shall not have a moisture content in excess of 1 percent by weight (mass) when discharged from the mixer. The moisture content shall be determined in accordance with TxDOT Test Method Tex-212-F, Part II, except that the sample shall be left in the oven a total of not less than four (4) hours.

#### 340S10 Construction Methods

A General: The Contractor shall be responsible for the production, transportation, placement and compaction of the specified HMA paving mixture to the requirements of this specification. The Contractor shall also be responsible for providing a safe environment for inspection personnel to inspect the equipment and to acquire samples.

All hot mix asphalt concrete pavement surface courses shall be placed with a spreading and finishing (lay-down) machine only. All hot mix asphalt concrete pavement base layers with the possible exception of the first lift of the base layer shall also be placed with a

spreading and finishing (lay-down) machine. Longitudinal pavement joints shall be located under the proposed lane lines. Density tests shall be taken prior to opening to traffic.

The first lift of a base layer may be placed with a motor grader if approved in advance by the Engineer or designated representative. The loose measure thickness of this first lift shall not exceed 6 inches (150 mm). If placed with a motor grader, the first lift shall achieve a minimum in-place relative density of 89% as determined by TxDOT test procedures TEX-207-F and TEX-227-F. All subsequent lifts should be placed with a spreading and finishing (lay-down) machine and shall be subject to the requirements of Section 340S.12, "Acceptance Plan". Density tests will be taken randomly to confirm compliance with the specification requirements.

For hot mix asphalt overlays, an automatic screed shall be used with outriggers.

Any material delivered to the Project that by visual inspection can reasonably be expected not to meet specification requirements (i.e. segregated or burned material, deficient or excess asphalt, low mixing temperature, visible contaminants, etc.), as determined by the Engineer or designated representative, shall not be used or left in place.

Equipment shall be inspected prior to use and, if found to be defective or in an operating condition that could potentially affect the quality of the finished pavement, as determined by the Engineer or designated representative, its use shall not be allowed. Leakage of fuels, oils, grease, hydraulic or brake fluids or other contaminants onto the prepared surface or newly-laid HMA layer will not be allowed and may require replacement of the affected pavement area.

The HMA paving mixture, when placed with a spreading and finishing machine, shall not be placed when the air temperature is below 50°F (10°C) and is falling, but it may be placed when the air temperature is above 40°F (4°C) and is rising.

The paving mixture, when used as a level-up course or when spread with a motor grader, shall not be placed when the air temperature is below 60°F (15°C) and is falling, but it may be placed when the air temperature is 50°F (10°C) and is rising. An HMA layer with a thickness of 1-1/2 inches (37.5 mm) and less shall not be placed when the temperature of the surface on which the layer is to be placed is below 50°F (10°C). The temperature shall be taken in a shaded area away from artificial heat.

Additional surface temperature requirements may be included in the Contract Documents or indicated on the Drawings.

Surfaces to be paved shall be finished, primed, cured, broomed and tacked, as appropriate, to the satisfaction of the Engineer or designated representative. If the surface on which the first course of the paving mixture is to be placed is a flexible base course, and a cut-back asphalt is to be used as a prime coat, the flexible base shall have been primed and cured a minimum of 24 hours before the paving mixture may be placed. The 24-hour restriction will not apply to a flexible base that has been primed with material other than a cutback. However, the surface on which the tack coat and/or paving mixture are to be placed shall be in a dry condition.

Pavement shall be opened to traffic as soon as possible after temporary pavement markings or permanent markings are in place as indicated on the Drawings) or as directed by the Engineer or designated representative. Construction traffic allowed on pavements open to the public will be subject to all laws governing traffic on streets and highways.

B. Tack Coat: The surface upon which the tack is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer or designated representative. The surface shall be given a

uniform application of tack coat as governed by Standard Specification Item No. 307S, "Tack Coat". The tack coat shall be applied, as directed by the Engineer or designated representative, with an approved sprayer at a rate not to exceed 0.05 gallons per square yard. (0.225 liters per square meter) of surface area. Where the paving mixture will adhere to the surface on which it is to be placed without the use of a tack coat, the tack coat may be eliminated when approved by the Engineer or designated representative. All contact surfaces of curbs, castings and all structures and all joints shall be painted with a thin uniform application of tack coat.

During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Before the Work can be accepted, all splatter shall be removed by the Contractor at <a href="the-Contractor">the Contractor</a>'s expense.

C. Transporting Hot Mix Asphaltic (HMA) Concrete: The HMA mixture shall be hauled to the Work site in tight vehicles that were previously cleaned of all foreign material. Dispatching of the vehicles shall normally be arranged so that all material delivered is placed and all rolling completed during daylight hours. Nighttime paving may be allowed, when approved in advance by the Engineer or designated representative.

In cool weather or for long hauls, truck bodies containing the HMA mixture shall be covered.

If necessary, to prevent the HMA mixture from adhering to the truck body, the inside of the truck may be given a light coating of a release agent satisfactory to the Engineer or designated representative.

D. HMA Placement: The HMA mixture shall be dumped and spread on the approved prepared surface with the spreading and finishing machine. When properly compacted, the finished pavement shall be smooth, of uniform texture and density and shall meet the requirements of the typical cross sections and the surface tests. In addition the placement of the HMA mixture shall be done without tearing, shoving, gouging or segregating the mixture and without producing streaks in the HMA layer.

Discharge of the HMA mixture into the finishing machine shall be controlled so that the spreading and finishing machine is not bounced or jarred and the required lines and grades shall be obtained without resorting to hand finishing except as permitted below in this Section.

Unless indicated otherwise on the Drawings, dumping of the HMA material in a windrow and then placing the HMA mixture in the finishing machine with windrow pick-up equipment will be permitted provided the temperature of the HMA mixture does not drop more than 50°F (28°C) below the target temperature before being placed by the finishing machine.

Under no circumstances will the HMA material be permitted to be dumped on or near the job site and then reloaded for hauling to the site of placement. Exceptions may be allowed if approved by the Engineer or designated representative.

The windrow pick-up equipment shall be operated in such a manner that substantially all the mixture deposited on the roadbed or prepared surface is picked up and loaded into the finishing machine without contamination by foreign material. The windrow pick-up equipment will also be so operated that the finishing machine will obtain the required line, grade and surface without resorting to hand finishing. Any operation of the windrow pick-up equipment resulting in accumulation and subsequent shedding of accumulated material into the HMA mixture will not be permitted.

When approved by the Engineer or designated representative, level-up courses may be spread with a motor grader that meets the requirements of this specification item.

The spreading and finishing machine shall be operated at a uniform forward speed consistent with the plant production rate, hauling capability and roller train capacity to result in a continuous operation. Stopping of the spreading and finishing machine between trucks is to be held to a minimum. If, in the opinion of the Engineer or designated representative, delivery of material is adversely affecting the condition of the HMA layer (excessive stopping of the spreading and finishing machine, loss of mixture temperature, etc.), the Engineer or designated representative may require paving operations to cease until acceptable methods are provided to minimize starting and stopping of the spreading and finishing machine.

The hopper gates of the spreading and finishing machine shall be adjusted to provide an adequate and consistent flow of material. This shall result in enough material being delivered to the augers so that they are operating approximately 85 percent of the time or more. The augers shall provide means to supply adequate flow of material to the center of the paver. Augers shall supply an adequate flow of material for the full width of the mat being placed, as approved by the Engineer or designated representative. Augers should be kept approximately one-half to three-quarters full of HMA mixture at all times during the paving operation.

When the HMA mixture is placed in a narrow strip along the edge of an existing pavement, or is used to level up small areas of an existing pavement or is placed in small irregular areas where the use of a finishing machine is not practical, the finishing machine may be eliminated when permitted by the Engineer or designated representative.

The paving material adjacent to castings and flush curb and gutter and structures shall be finished uniformly high so that when compacted, it will be slightly above but not more than 1/8 inch (3 mm) above the edge of the casting or gutter lip.

Construction joints of successive courses of HMA material shall be offset at least 6 inches (150 mm). Longitudinal joints in the layer shall be placed to coincide with lane lines as directed the Engineer or designated representative. Transverse joints shall be offset a minimum of 5 feet (1.5 meters).

E. Compaction: The pavement layers/lifts shall be compacted thoroughly and uniformly to obtain the compaction and cross section meeting the requirements indicated on the Drawings and this specification item.

Regardless of the method used for compaction, all rolling to achieve specified density shall cease before the temperature of the HMA mixture drops below 175°F (80°C).

Rolling with a pneumatic tire roller shall be used to seal the surface. Rolling with a tandem or other steel-wheel roller shall be provided if required to iron out any roller marks. Surface sealing and removal of roller marks may be accomplished at HMA temperatures below 175°F (80°C).

Vibratory rollers shall not be allowed in the vibrating mode on layers with a plan thickness less than 1-1/2 inches (37.5 mm).

The motion of the rollers shall be slow enough to avoid other than usual initial displacement. If any displacement occurs, it shall be corrected to the satisfaction of the Engineer or designated representative.

The roller shall not be allowed to stand on pavement, which has not been compacted to minimum density requirements. In order to prevent adhesion of the surface mixture to the steel-wheel rollers, the wheels shall be thoroughly moistened with water; however an excess

of water will not be allowed. Necessary precautions shall be taken to prevent the dropping of diesel, gasoline, oil, grease or other foreign matter on the pavement, either when the rollers are in operation or when standing.

The edges of the pavement along curbs, headers and similar structures, and all places not accessible to the roller, or in such positions as will not allow thorough compaction with the rollers, shall be thoroughly compacted with lightly oiled tamps.

Rolling with a trench roller will be required on widened areas, in trenches and other limited areas where satisfactory density cannot be obtained with the approved rollers.

#### 340S.11 Sampling and Testing

The HMA mixture shall be tested daily at the Project site for conformance to specification requirements. The Engineer or designated representative shall utilize a random selection method to determine sample locations based on the Contractor's anticipated production. Each day's anticipated production shall be divided into three (3) essentially equal single-pass, sub-area lots. Each day's sample locations shall be equally distributed over the three (3) sub-areas. If, due to the weather or plant malfunctions, the Contractor's daily-anticipated production is not attained, the random locations will not be recalculated. Also, no more than one location of the three (3) sub-areas shall be located in an irregular shaped area such as a cul-de-sac.

Unless directed otherwise by the Engineer or designated representative, a minimum of three bag samples and three correlating 6-inch (150-mm) cores will be obtained from each day's production.

Bag samples shall be taken during lay-down operations. The primary sampling point for the bag samples shall be from the windrow if a windrow elevator is used. If a windrow elevator is not used, the sample shall be taken from the middle of the paving machine hopper. This sampling location will require a stoppage in the paving operation in order for the Inspector to safely secure a sample from the hopper.

One core shall be taken for every 2,000 single-pass square yards (1 675 single-pass square meters) with a minimum of three (3) cores for all projects. One core shall be taken at the same station and pass sampled for each of the bag samples. Cores shall be taken by the City's laboratory within 48 hours of pavement laydown unless otherwise directed by the Engineer or designated representative.

For total areas of less than 500 square yards (420 square meters), a total of only two bag samples and two correlating cores will be obtained. If the Contractor desires additional testing, it shall be at its own entire expense.

The Engineer or designated representative may alter, increase or waive the testing schedule to ensure that the Work performed and the material used meet specification requirements. Acceptability of the completed pavement shall be based on the average of test results for the Project as defined in Section 340S.12, "Acceptance Plan" of this item.

Gradation, asphalt content and stability value of the HMA mixture shall be reported for each of the bag samples. The stability value reported for each of the bag samples shall be the average of three (3) tests per bag.

Pavement thickness and density shall be determined from 6-inch (150 mm) field cores. For each day's placement, density of cores for which no corresponding bag samples were taken shall be determined by using the average Maximum Theoretical Density of the day's three (3) bag samples or as may otherwise be determined by the Engineer or designated representative.

When, in the opinion of the Engineer or designated representative, test results appear unrepresentative, additional testing may be authorized. The retesting will be at the expense of the Contractor and the results of the retesting shall be averaged with the results of the original testing. If the results of retesting indicate that the original test results were erroneous, the original test results will be discarded. In the instance of erroneous original test results the subsequent first set of retests will be at the expense of the City of Austin.

Pavements with low-density results may be recored; but the pavement shall not receive any additional compactive effort.

Pavements that will not or cannot be cored within 48 hours shall be closed to both public and construction traffic.

#### 340S.12 Acceptance Plan

For the purpose of the Acceptance Plan only, the "Paving Project" of each of the specified mixture types shall be defined by the Engineer or designated representative before the paving operation begins

Considerations for defining the Paving Project shall include paving operations staged due to traffic considerations, pavement structural section (i.e. with varying layer thicknesses), time required for paving, changes to the Job Mix Formula, phasing of large projects, or other factors affecting the consistency in the production, lay-down/compaction, use of completed portions, and/or aging of in-place material.

Acceptability of the completed pavement structure for a Paving Project shall be based on all daily averages of three test results and when approved by the Engineer or designated representative the overall average of all test results for each of the mixture/layer types specified on the Drawings.

Pay adjustments for two or more acceptance factors shall be accumulative. Pay adjustments of 100% unit price reduction shall require removal and replacement of the Work. Replacement materials shall be subject to all requirements of this specification. Alternatively, the Engineer or designated representative may allow the Work to remain in place without payment provided that the Work is warranted for an extended period under conditions as determined by the Engineer or designated representative. The decision of the Engineer or designated representative related to the removal and replacement of the Work shall be the final authority.

### A. Non-Pay-Adjustment Acceptance Factors:

1 Surface Characteristics: Unless otherwise directed by the Engineer or designated representative, all pavements shall be tested for smoothness. Surfaces shall be tested with a 10-foot (3.05 meter) straightedge parallel to the roadway centerline and perpendicular to the centerline on flat, cross-slope sections. Maximum allowable deviation in 10 feet shall be 1/8 inch (1-mm per meter) parallel to the centerline and 1/4 inch (2-mm per meter) perpendicular to the centerline. Sections exceeding these maximums shall be corrected to the satisfaction of the Engineer or designated representative. The completed surface must meet the approval of the Engineer or designated representative for surface smoothness, finish and appearance.

If the surface ravels, ruts or deteriorates in any manner prior to the end of the warranty period, it will be the Contractor's responsibility to correct this condition at its own entire expense to the satisfaction of the Engineer or designated representative in conformance with the requirements of this specification.

For HMAC rehabilitation and overlay projects, if cracks develop in the pavement surface within the one-year warranty period, the Contractor shall seal the cracks in accordance with Standard Specification Item No. 313S, "Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete). Payment for this work will be measured and paid for as Mobilization (LS) and Crack Sealing (LF).

For new HMAC roadways constructed in accordance with the Drawings and specifications, if cracks less than 1/4 inch (6 mm) in width develop in the pavement surface within the one year warranty period the Contractor shall seal the cracks in accordance with Standard Specification Item No. 313S, "Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete). Payment for this Work will be measured and paid for as Mobilization (LS) and Crack Sealing (LF).

If cracks equal to or greater than 1/4 inch (6 mm) in width develop in the pavement surface within the one-year warranty period, the cracking shall be reviewed and evaluated by the Engineer or designated representative before corrective action is taken.

- 2. Stability: Stability test results shall be used as indicators of potential problems. Where stability test results fall below the range specified in this specification, additional tests shall be taken as directed by the Engineer or designated representative for further evaluation and monitoring of the paving mixture. This additional stability testing will be at the expense of the Contractor. When, in the opinion of the Engineer or designated representative, the stability is deemed unacceptable for the intended use of the pavement, the paving mixture shall be removed and replaced to the limits indicated by test results or may be left in place on conditions acceptable to the Engineer or designated representative. When the paving mixture is removed and replaced, it shall be at the sole expense of the Contractor.
- 3. Laboratory Density: Laboratory density results as determined by TxDOT Test Method Tex-207-F shall be used as indicators of potential problems. Where laboratory density test results are less than 94.5% or more than 97.5% of mix design maximum density, additional tests shall be taken as directed by the Engineer or designated representative for further evaluation and monitoring of the paving mixture. This additional laboratory density testing will be at the expense of the Contractor. When, in the opinion of the Engineer or designated representative, the laboratory density is deemed unacceptable for the intended use of the pavement, the paving mixture shall be removed and replaced to the limits indicated by test results.

The removal and replacement of the paving mixture shall be at the sole expense of the Contractor.

- 4. Limited Areas: Irrespective of an acceptable overall Paving Project average for any or all of the Pay-Adjustment Acceptance Factors, limited substandard portions of the Work, as determined by the Engineer or designated representative, shall be remedied or removed and replaced to the satisfaction of the Engineer or designated representative at the sole expense of the Contractor.
- B. Pay-Adjustment Acceptance Factors: Contract unit prices shall be adjusted for paving mixtures that fail to meet acceptance criteria for gradation, asphalt content, density and mat thickness in accordance with the following:

	Deviation From	Job Mix Formula	Percent Contract Unit
Sieve	Daily Average	Overall Average	Price Reduction
Total retained on	± 6.5	± 5.0	0
No. 10 (2.00 mm)	6.6±	5.1±	10
Passing No. 200	± 3.9	± 3.0	0
(75 µm)	4.0±	3.1±	5

## **Asphalt Content Acceptance Schedule (TEX-210-F, PartII)**

	n from the Formula	Percent Contract U	nit Price Reduction
Daily Average	Overall Average	Local Streets*	All Others
± 0.5	± 0.4	0	0
±0.51 to ±0.60	±0. 41 to ±0.50	15	25
+0.61 to +0.70	+0.51 to +0.60	25**	100; Remove and Replace
-0.61 to -0.70	-0.51 to -0.60	100: Remove and Replace	100; Remove and Replace
Over ±0.70	Over ±0.60	100: Remove and Replace	100; Remove and Replace

<sup>\*</sup>A local or residential street that serves as access to residence or other abutting property.

## **Density Acceptance Schedule (TEX-207-F/TEX-227-F)**

*Percen	t Density	Percent Contract Unit	Price Reduction
Daily Average	Overall Average	1-1/2" (38 mm) Thickness or Greater	Less than 1-1/2" (38 mm) Thickness
Above 96.5	Above 96	100; Remove and Replace	100; Remove and Replace
90.5 to 96.5	91 to 96	0	0
90.5 to 87.6	90.9 to 88.1	0.625 per 0.10% deficiency	0.50 per 0.10% deficiency
		in density	in density
Less than 87.6	Less than 88.1	100: Remove and Replace	100; Remove and Replace
*Core bu	lk density divided	by max. theoretical density	

## **Thickness Acceptance Schedule**

Variance I	Percent of Thickness	Percent Contract Unit Price Reduction
Daily Average	Overall Average	
0 – 15.0	0 - 10	0
15.1 – 20.0	10.1 - 16	20
20.1 – 30.0	16.1 - 25	50
Over 30.0	Over 25	100; Remove and Replace or mill/overlay 1" (25 mm) minimum

The Density Acceptance Schedule For Irregularly Shaped Areas; Hike And Bike Trails And Utility Trenches (see following table) will apply to utility trenches of widths less than 4 feet

<sup>\*\*</sup>If the street has an ADT of 500, or less, with 1%, or less, of truck traffic, plus a 2 year warranty; otherwise, Remove and Replace

(1.2 meter) and to irregular shaped areas and hike and bike trails in which an appropriate rolling pattern cannot be established making it difficult to achieve compaction.

## Density Acceptance Schedule For Irregularly Shaped Areas; Hike And Bike Trails and Utility Trenches (TEX-207-F/TEX-227-F)

*Percent Density	Percent Contract Unit Price	ce Reduction
Daily Average	1-1/2" (38 mm) Thickness or	Less than 1-1/2" (38 mm)
	Greater	Thickness
Above 96.5	100; Remove and Replace	100; Remove and Replace
96.5 to 89.0	0	0
89.0 to 86.1	0.625 per 0.10% deficiency	0.50 per 0.10% deficiency
	in density	in density
Less than 86.1	100: Remove and Replace	100; Remove and Replace
*Core bulk dens	sity divided by maximum theoretica	al density

The Density Acceptance Schedule will apply to utility trenches 4 feet (1.2 meter) or wider.

Core thicknesses greater than Drawing requirements shall be factored into the average thickness calculation as the Drawing required thickness. If total thickness of lift(s) proves to be less than required, the Contractor may remove and replace the overlay deficient areas as agreed to by the Engineer or designated representative. Overlays to correct thickness deficiencies shall be not less than one (1) inch (25-mm) thick. Overlays shall require milling of the asphalt in order to prevent a "featheredge" of the overlaying pavement.

The extent of the area to be overlaid or removed and replaced shall be determined by additional cores with thicknesses greater than or equal to the required thickness. All additional coring that is necessary to determine the area shall be paid for by the Contractor.

#### 340S.13 Measurement

Work performed and material placed shall be measured under one of the following methods. When Drawing quantity measurement is specified, adjustment of quantity may be made as follows. If the quantity measured as outlined vary from those shown on the Drawings by more than 5%, either party to the Contract may request in writing and adjustment of the quantity by each separate bid item. The party to the Contract which requests the adjustment shall present to the other party one copy of measurements and calculations showing the revised quantity in question. This revised quantity, when approved by the Engineer or designated representative, shall constitute the final quantity for which payment will be made. However, no adjustment will be made for any quantity, which exceeds the Drawing required thickness.

A. Method A: Asphaltic concrete pavement shall be measured by the ton (2,000 pounds) of the type actually used in completed and accepted Work in accordance with the Drawings and specifications.

The measurement shall be made on approved truck scales that meet the requirements of the National Institute of Standards and Technology Handbooks 44 and 112 except that the required accuracy shall be 0.4 percent of the load being weighed. The Contractor shall furnish a report of calibration from a scale mechanic licensed by the Texas Department of Agriculture certifying that the scales meet this requirement.

B. Method B: Asphaltic concrete pavement shall be measured by the square yard of specified total thickness of the type of paving mixture actually used in completed and accepted Work in

- accordance with Drawings and specifications. Multiple lifts of the same type shall be considered as one for square yard measurement purposes.
- C. Method C: Asphaltic concrete pavement shall be measured by the lineal foot of specified total thickness of the type of paving mixture actually used in completed and accepted Work in accordance with Drawings and specifications. Multiple lifts of the same type shall be considered as one for linear foot measurement purposes.

## 340S.14 Payment

Work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for at the unit bid prices or pay adjusted unit price for Hot Mix Asphaltic Concrete Pavement, of the types and thicknesses specified. The unit bid prices shall include full compensation for furnishing all labor, equipment, time, materials and incidentals necessary to complete the Work.

Removal of existing hot mix asphalt concrete transition areas prior to overlay, tack coat, saw cutting and temporary pavement markings will not be measured or paid for directly but shall be included in the unit price bid for Standard Specification Item No. 340S, "Hot Mix Asphaltic Concrete Pavement".

Payment for Work meeting these specifications will be made under one of the following:

Pay Item No. 340S-A:	Hot Mix Asphaltic Concrete Pavement, Type,	Per Ton.
Pay Item No. 340S-B:	Hot Mix Asphaltic Concrete Pavement,Inches, Type,	Per Square Yard
Pay Item No. 340S-C:	Hot Mix Asphaltic Concrete Pavement,Inches, Type,	Per Lineal Foot.
Pay Item No. 340S-PQ:	Hot Mix Asphaltic Concrete Pavement,Inches, Type, Plan Quantity,	Per Ton
Pay Item No. 340S-L:	Hot Mix Asphaltic Concrete Pavement,In., Type, Level-up Course,	Lump Sum.
Pay Item No. 340S-M:	Crack Sealing Mobilization,	Lump Sum.
Pay Item No. 340S-S:	Crack Sealing,	Per Lineal Foot.

End

## **SPECIFIC** CROSS REFERENCE MATERIALS

Special Specification Item 340S "Hot Mix Asphaltic Concrete Pavement"

## City of Austin Standard Specifications

Designation	Description
Item No. 230S	Rolling (Flat Wheel)
Item No. 232S	Rolling (Pneumatic Tire)
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 307S	Tack Coat

Item No. 313S Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete)

## Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u>	<u>Description</u>
Tex-106E	Method of Calculating the Plasticity Index of Soils
Tex-107E	Determination of Bar Linear Shrinkage of Soils
Tex-200-F	Sieve Analysis of Fine and Coarse Aggregates
Tex-203-F	Sand Equivalent Test
Tex-204-F	Design of Bituminous Mixtures
Tex-207-F	Determination of Density of Compacted Bituminous Mixtures
Tex-208-F	Test for Stabilometer Value of Bituminous Mixtures
Tex-210-F	Determination of Asphalt Content of Bituminous Mixtures by
	Extraction
Tex-212-F, Part II	Determination of Moisture Content of Bituminous Mixtures (by oven drying)
Tex-217-F	Determination of Deleterious Material and Decantation Test For Coarse Aggregates
Tex-227-F	Theoretical Maximum Specific Gravity of Bituminous Mixtures
Tex-410-A	Abrasion of Coarse Aggregate Using the Los Angeles Machine
Tex-460-A	Determination of Crushed Face Particle

## Texas Department of Transportation: Standard Specifications for Construction and

Maintenance of Highways, Streets, and Bridges

<u>Designation</u> <u>Description</u>

Item 340 Hot Mix Asphalt Concrete Pavement

## **RELATED** CROSS REFERENCE MATERIALS

Special Specification Item 340S "Hot Mix Asphaltic Concrete Pavement"

#### City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 206S	Asphalt Stabilized Base
Item No. 210S	Flexible Base
Item No. 306S	Prime Coat
Item No. 310S	Emulsified Asphalt Treatment
Item No. 311S	Emulsified Asphalt Repaving
Item No. 320S	Two Course Surface Treatment

## Texas Department of Transportation: Manual of Testing Procedures

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Tex-215-F Determination of Asphalt Content of Rock Asphalt By Hot Solvent

Method

Tex-224-F Determination of Flakiness

Tex-400-A Method of Sampling Stone, Gravel, Sand and Mineral Aggregates

Tex-411-A Soundness of Aggregate by Use of Sodium Sulfate or magnesium

Sulfate

Tex-438-A Accelerated Polish Test for Aggregate

## Item No. 402S Controlled Low Strength Material

#### 402S.1 Description

This item governs Controlled Low Strength Material (CLSM) used for trench backfill and for filling abandoned culverts, pipes, other enclosures, and for other uses as indicated on the drawings, Standard Details or as approved by the Engineer or designated representative. CLSM is a low strength, self-compacting, flowable, cementitious material used in lieu of soil backfill. It is intentionally prepared at low strength to allow for future removal using conventional excavation equipment.

The CLSM shall be composed of Portland cement or fly ash, or both, filler aggregate and water. The CLSM, specified for use in filling abandoned culverts, pipes, or other enclosures, shall contain a settlement compensator, in addition to the other ingredients, to minimize settlement of the CLSM within the enclosure.

Normal Set CLSM shall be specified whenever the material will remain uncovered or will not be subjected to traffic or other loads within 24 hours after placement. Fast Set CLSM shall be specified whenever the material will be covered, subjected to traffic or other loads within 24 hours, or needed to expedite construction.

CLSM can be used for permanent subgrade repairs below the base layer, but shall not be used for permanent pavement repairs. For temporary traffic applications, a minimum 2 inch (50 mm) cap composed of Hot Mix-Cold Laid Asphaltic Concrete (TxDoT Standard Specification Item 334) shall be placed on the CLSM.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 402S.2 Submittals

The submittal requirements of this specification item include:

- A. A mix design submittal including the results of unconfined compressive strength tests, air entrainment (if applicable), flow consistency, hardened unit weight, and timed Ball Drop and corresponding Penetrometer tests.
- B. Certifications and test results for the cement fly ash, and admixtures.
- C. Particle-size gradation and specific gravity tests on the filler aggregate.

#### 402S.3 Materials

## A. Cement.

Portland cement shall conform to ASTM C 150, Type I (General Purpose).

Portland cement manufactured in a cement kiln fueled by hazardous waste shall be considered as an approved product if the production facility is authorized to operate under regulation of the Texas Natural Resource Conservation Commission

(TNRCC) and the U. S. Environmental Protection Agency (EPA). Supplier shall provide current TNRCC and EPA authorizations to operate the facility.

#### B. Fly Ash

Fly ash shall conform to the requirements of Standard Specification Item No. 405, "Concrete Admixtures" and TxDOT Specification Item 437.

## C. Filler Aggregate.

Filler aggregate shall consist of sand, stone screenings, pavement milling cuttings or other granular material that is compatible with the other mixture components. The filler aggregate shall be fine enough to stay in suspension to the extent required for proper flow without segregation, and, in the case of filling of enclosures, for minimal settlement. Filler aggregate shall have a Plasticity Index (TxDOT Test Method Tex-106-E) less than 15 and shall conform to the following gradation:

Sieve Designation	US	(SI)	Percent Passing
N	lo. 200	(75µm)	0 - 10

#### D. Mixing Water.

Mixing water shall conform to the requirements of Standard Specification Item No. 403, "Concrete for Structures".

### E. Settlement Compensator

An air entraining admixture with a higher than usual dosage, which meets the requirements of Standard Specification Item No. 405, "Concrete Admixtures", shall be used as a settlement compensator. The settlement compensator may be introduced to the CLSM at the job site by placement of prepackaged admixture in capsules or bags in the mixing drum in accordance with the admixture manufacturer's recommendations.

## 402S.4 Mix Design

The proportioning of CLSM shall be the responsibility of the Contractor. The Contractor shall furnish a mix design conforming to the requirements herein, for review and approval by the Engineer or designated representative. The mix design shall be prepared by a qualified commercial laboratory and then reviewed and signed by a registered Professional Engineer licensed in the State of Texas.

The Mix Design submittal must include:

- A. Test results for unconfined compressive strength, air entrainment (if applicable), flow consistency, hardened unit weight, and timed Ball Drop (ASTM C-360) and corresponding Penetrometer tests (with a concrete pocket penetrometer),
- B. Certifications and test results for the cement, fly ash, and admixtures, and
- Results of particle-size gradation and specific gravity tests on the filler aggregate.
   The submittal shall include Penetrometer tests performed every thirty minutes

until the Ball Drop test shows a 2-inch (50 mm) indentation, as well as the predicted Penetrometer reading that corresponds to a 3-inch (75 mm) Ball Drop indentation. Particle-size gradation shall be determined using a series of sieves that gives no fewer than five uniformly spaced points for graphing the entire range of particle sizes larger than a No. 200 sieve (75-µm).

The Contractor shall perform the work required to substantiate the design at no cost to the City, including all testing. Approved mix designs shall be valid for one year, provided there are no changes in the type, source, or characteristics of the materials during that year.

At the end of one year, the mix design may be submitted for renewal, provided that:

- A. field tests of the CLSM during the year have been satisfactory,
- B. there have been no changes in type or source of the materials of the mix, and
- C. the characteristics of the materials have not changed significantly since the original submittal.

The Contractor shall also submit certifications and test results for the cement, fly ash and admixtures, and particle-size gradation and specific gravity test results for the filler aggregate. The Contractor shall compare results of tests made on the filler aggregate at the end of the year to the results of tests reported in the original submittal. Gradation changes less than ten percent in percent passing any sieve and specific gravity changes less than five percent shall not be considered significant.

## 402S.5 Strength

The CLSM mix designs shall meet the unconfined compressive strength requirements outlined in the table below. The compression tests shall be conducted in accordance with TxDOT Method Tex-418-A, using approved unbonded caps on specimens with four-inch (100 mm) diameter and eight-inch (200 mm) height [or three-inch (75 mm) diameter by six-inch (150 mm) high specimens if a smaller capacity loading device gives more accurate results].

Unconfined Compressive Strength, psi (mPa)		
Age	Normal Set CLSM	Fast Set CLSM
3 hours	_	35 (0.24) minimum
24 hours	35 (0.24) minimum	_
28 days	300 (2.1) maximum	300 (2.1) maximum

#### 402S.6 Flow Consistency

Flow consistency shall be established in tests involving the use of a six-inch (150 mm) length by three-inch (75 mm) diameter open-ended straight tubing made of steel, plastic or other non-absorbent material that is non-reactive with cement or fly ash. The tube shall be placed with one end on a horizontal flat surface and held in a vertical position. The tube shall then be filled to the top with CLSM. The top surface shall be struck off with a suitable straight edge and any spillage shall be removed from the base of the tube. Within five seconds thereafter the tube shall be raised carefully, using a steady

upward lift with no lateral or torsional motion. The entire test, from the start of filling until removal of the tube, shall be completed within 1½ minutes without interruption.

After removal of the tube, the spread of the CLSM shall be measured immediately along two diameters that are perpendicular to one another. The average of those two measurements is defined as the flow consistency of the mix. The flow consistency of the CLSM shall be considered satisfactory if a circular-type spread of the mix occurs without segregation and a flow consistency (average diameter of spread) of 8 inches (200 mm) or more is achieved.

#### 402S.7 Air Entrainment

Air entraining admixture shall be added as a settlement compensator, whenever the CLSM will be used to fill an enclosure (Section 402S-1). The dosage shall be sufficient to result in an air content of 15 to 25 percent (as determined by TxDOT Method Tex-416-A) at the time of placement of the CLSM.

## 402S.8 Field Strength Tests

Ball Drop or Penetrometer tests shall be used to determine, when the CLSM has developed sufficient strength to be covered or subjected to traffic or other loads as approved by the Engineer or designated representative.

The Ball Drop test shall be performed according to the latest version of ASTM C-360. An indentation diameter of three inches (75 mm) or less, and the absence of a sheen or any visible surface water in the indentation area shall indicate that the CLSM has achieved the desired strength. Because trench width and depth may affect the test results, the Contractor may perform this test on a control sample of CLSM in a two-foot (600 mm) square by six-inch (150 mm) deep container.

Penetrometer tests using a hand-held, spring reaction-type device commonly called a concrete pocket penetrometer, shall be performed on the surface of the CLMS. A Penetrometer reading, equal to or greater than the value established in the mix design (Section 402S.4) for a Ball Drop test indentation of 3-inches (75 mm), shall indicate that the CLSM has achieved the desired strength.

#### 402S.9 Construction Methods

#### A. General

The height of free fall placement of the CLSM shall not exceed four feet (1.2 meters). Since CLSM is considered to be self-compacting, a vibrator shall not be allowed. The CLSM shall not be covered with any overlying materials or subjected to traffic or other loads until the Ball Drop test or the Penetrometer test shows acceptable results (Section 402S.8) or until the CLSM has been in place a minimum of 24 hours for Normal Set CLSM and a minimum of 3 hours for Fast Set CLSM. Curing of the CLSM will not be required.

#### B. Utility Line Backfill

Current Version: November 13, 2007

After the utility pipe has been placed and the proper bedding material placed in accordance with the details on the drawings, the trench may be immediately backfilled with the CLSM to the subgrade level shown on the drawings, Standard Details 1100S-6A, B, C & D, 430S-4, 511S-13A and 511S-13B or as directed by the Engineer or designated representative.

#### C. Culvert Backfill

Care shall be taken to prevent movement of the structure. If the pipe or structure moves either horizontally or vertically, the CLSM and the structure shall be immediately removed and the pipe or structure re-laid to proper line and grade.

#### D. Other Backfill

CLSM may be used for backfill material in lieu of soil as shown on the drawings, Standard Details or as approved by the Engineer or designated representative.

#### E. Filling Abandoned Culverts, Pipe, or other Enclosures

The CLSM shall be placed in a manner that allows all air or water, or both, to be displaced readily as the CLSM fills the enclosure.

### **402S.10** Acceptance Testing During Construction

The Engineer or designated representative may perform flow consistency, air entrainment, and unconfined compressive strength tests to determine if the CLSM meets the specification requirements. The number and frequency of acceptance tests will be determined by the Engineer or designated representative.

## **402S.11 Measurement and Payment**

The work and materials presented herein will generally not be paid for directly, but shall be included in the unit price bid for the item of construction in which this item is used.

When specified in the contract bid form as a separate pay item, the item will be paid for at the contract unit bid price(s) for "Controlled Low Strength Material". The bid prices shall include full compensation for all Work herein specified, including the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the Work.

Payment will be made under the following:

Pay Item No. 402S-A: Controlled Low Strength Material Per Cubic Yard.

#### End

SPECIFIC CROSS REFERENCE MATERIALS
Standard Specification Item 402S, "Controlled Low Strength Material"

## City of Austin Standard Details Designation Description

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1100S-6A Narrow Excavation Next to C&G - Trench Width 0.3 M (12") & Less Narrow Excavations - Trench Width 0.3 M (12") & Less 1100S-6C Excavation Next to C&G - Trench Width Greater than 0.3 M (12") Excavations - Trench Width Greater than 0.3 M (12")

## City of Austin Standard Specification Items

Designation Description

Item No 403S Concrete for Structures
Item No 405S Concrete Admixtures

## Texas Department of Transportation: Standard Specifications for Construction and

## Maintenance of Highways, Streets, and Bridges

<u>Description</u>
Hot Mix-Cold Laid Asphaltic Concrete Pavement
Concrete Structures
Portland Cement Concrete
Concrete Admixtures

#### **RELATED** CROSS REFERENCE MATERIALS

Standard Specification Item 402S, "Controlled Low Strength Material"

## Texas Department of Transportation: Manual of Testing Procedures

Designation	Description

Tex-106-E Method Of Calculating the Plasticity Index of Soils

Tex-416-A Air Content of Freshly Mixed Concrete By The Pressure Method

Tex-418-A Compressive Strength of Cylindrical Concrete

#### American Society for Testing and Materials (ASTM)

<u>Designation</u>	<u>Description</u>
ASTM C 150	Portland Cement

ASTM C 360 Ball Penetration in Fresh Portland Cement Concrete

ASTM C 403 Time of Setting of Concrete Mixtures by Penetration Resistance

#### City of Austin Standard Specification Items

<u>Designation</u>	<u>Description</u>
Item No. 504S	Adjusting Structures
Item No. 506S	Manholes

Item No. 508S Miscellaneous Structures and Appurtenances

Item No. 510 Pipe

Previous Versions: 12/09/08, 06/16/08, 11/13/07, 02/26/02, 04/17/86 and 05/23/00

Item No. 430S P.C. Concrete Curb and Gutter

## 430S.1 Description

This item shall govern Portland Cement (p.c.) concrete curb, p.c. concrete curb and gutter with reinforcing steel or p.c. concrete laydown curb as required, that is constructed in accordance with this specification on an approved subgrade and base in conformity with Standard Detail Series 430S and the lines, grades, section indicated on the Drawings or as established by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 430S.2 Submittals

The submittal requirements of this specification item include:

- A. Class A p.c. concrete mix design,
- B. Type of Installation (i.e. P.C. Concrete Curb and Gutter or P.C. Concrete Curb or P.C. Concrete Laydown Curb) and construction details (i.e. base, reinforcing steel, joints, curing membrane),
- C. Identification of the type, source, mixture, Pure Live Seed (PLS) and rate of application of the seeding.

#### 430S.3 Materials

#### A. Concrete

The Portland cement (p.c.) concrete shall conform to Class A Concrete, Section 403S.7 (Table 4) of Standard Specification Item No. 403S, "Concrete for Structures" or Sections 360S.4 and 360S.6 of Standard Specification Item No. 360S, "Concrete Pavement" when curb and gutter is to be constructed integral with the pavement.

#### B. Reinforcing Steel

Reinforcing steel shall conform to Standard Specification Item No. 406S, "Reinforcing Steel".

#### C. Expansion Joint Materials

Expansion joint materials shall conform to Standard Specification Item No. 408S, "Expansion Joint Materials".

#### D. Membrane Curing Compound

Membrane curing compound shall conform to Standard Specification Item No. 409S, "Membrane Curing".

#### E. Flexible Base

Aggregate shall conform to Standard Specification Item No. 210S, "Flexible Base".

#### 430S.4 Construction Methods

#### A. Subgrade and Base Preparation

Subgrade for curb and gutter shall be excavated and prepared to depth and width requirements indicated on the Drawings, including a minimum of 12 inches (300 mm) behind the curb, unless a greater width is indicated on the Drawings. The subgrade shall be shaped to the line, grades, cross section and dimensions indicated on the Drawings. A minimum of 4 inches (100 mm) of flexible base shall be spread, wetted and thoroughly compacted under curb and gutter as specified in Standard Specification Item No. 210S, "Flexible Base". If dry, the base shall be sprinkled lightly with water before p.c. concrete is deposited thereon.

#### B. C & G Forms

Forms shall be of metal, well-seasoned wood or other approved material. The length of the forms shall be a minimum of 10 feet (3 meters). Flexible or curved forms shall be used for curves of 100-foot (30 meter) radius or less. Wood forms for straight sections shall be not less than 2 inches (50 mm) in thickness. Forms shall be a section, that is satisfactory to the Engineer or designated representative, of the depth required and clean, straight, free from warp and, if required, oiled with a light form oil. All forms shall be securely staked to line and grade and maintained in a true position during the placement of p.c. concrete.

## C. Reinforcing Steel

The reinforcing steel, if required, shall be placed as shown on the typical section of the Drawings. Care shall be exercised to keep all steel in its proper location during p.c. concrete placement.

#### D. Joints

Joints shall be of the type and spacing shown on the Drawings. Expansion joint material, 3/4 inch (19 mm) in thickness, shall be provided at intervals not to exceed 40 feet (12 meters) and shall extend the full width and depth of the p.c. concrete. Weakened plane joints shall be made 3/4 inch (19 mm) deep at 10-foot (3 meters) intervals. All joint headers shall be braced perpendicular and at right angles to the curb.

Two round smooth dowel bars, 1/2 inch (12.5 mm) in diameter and 24 inches (600 mm) in length, shall be installed at each expansion joint. Sixteen inches (400 mm) of one end of each dowel shall be thoroughly coated with hot oil, asphalt or red lead, so that it will not bond to the concrete. The dowels shall be installed with a dowel sleeve on the coated end as indicated on the Drawings or equivalent method as directed by the Engineer or designated representative.

#### E. P.C. Concrete Placement and Form Removal

Concrete shall be placed in the forms and properly consolidated. Within 1 hour after p.c. concrete placement, a thin coating, that is no more than 1/2 inch (12.5 mm) nor less than 1/4 inch (6.25 mm) thick of finish mortar, composed of 1 part Portland Cement to 2 parts fine aggregate, shall be worked into the exposed faces of the curb and gutter by means of a "mule". After the p.c. concrete has become sufficiently set, the exposed edges shall be rounded by the use of an edging tool to the radii indicated on Standard Detail 430S-1. The entire exposed surface of the curb and gutter shall be floated to a uniform smooth surface, and then finished with

Previous Versions: 12/09/08, 06/16/08, 11/13/07, 02/26/02, 04/17/86 and 05/23/00

a camel hairbrush to a gritty texture. The forms shall remain in place a minimum of 24 hours unless approved otherwise by the Engineer or designated representative.

After removal of the forms, any minor honeycombed surfaces shall be plastered with a mortar mix as described above. Excessively honeycombed curb and gutter, as determined by the Engineer or designated representative, shall be completely removed and replaced when directed.

### F. Curing

Immediately after finishing the curb, concrete shall be protected by a membrane curing conforming to Standard Specification Item No. 409S, "Membrane Curing".

After a minimum of 3 days curing and before placement of the final lift of the base course, the curb shall be backfilled to the full height of the p.c. concrete, tamped and sloped as directed by the Engineer or designated representative. The upper 4 inches (100-mm) of backfill shall be of clean topsoil that conforms to Standard Specification Item No. 130S, "Borrow" and is free of stones and debris.

## G. Seeding in Turf Areas

When turf is to be established, preparation of the seedbed shall conform to Item No. 604S, "Seeding for Erosion Control".

#### 430S.5 Measurement

Accepted work as prescribed by this item will be measured by the lineal foot (lineal meter: 1 lineal meter equals 3.281 lineal feet) of p.c. concrete curb and gutter, p.c. concrete curb and/or p.c. concrete laydown curb, complete in place.

#### 430S.6 Payment

The work performed as prescribed by this item will be paid for at the unit bid price per lineal foot for "P.C. Concrete Curb and Gutter" or P.C. Concrete Curb. The price shall include full compensation for all work as set forth and described under payment Method A and/or B.

#### A. Method A (Pay Item No. 430S-A)

This payment method shall include all the work performed for "P.C. Concrete Curb and Gutter" complete, at the unit bid price. The unit bid price shall include full compensation for excavation, preparation of the subgrade, furnishing and placing all concrete and base material, reinforcing steel, dowels, expansion joint material, curing material, backfill and for all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

## B. Method B (Pay Item No. 430S-B)

This payment method includes all the work performed for "P.C. Concrete Curb and Gutter", complete, at the unit bid price. The unit bid price shall include full compensation for fine grading, furnishing and placing concrete and reinforcing steel, dowels, expansion joint material, curing material, backfill and for all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

#### C. Method C (Pay Item No. 430S-C)

This payment method includes all the work performed for "P.C. Concrete Curb" complete, at the unit bid price. The unit bid price shall include full compensation for excavation, furnishing and placing all concrete and base material, reinforcing steel, dowels, expansion joint material, curing material, backfill and for all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

#### D. Method D (Pay Item No. 430S-D)

This payment method includes all the work performed for "P.C. Concrete Curb" complete, at the unit bid price. The unit bid price shall include full compensation for fine grading, furnishing and placing concrete and reinforcing steel, dowels, expansion joint material, curing material, backfill and for other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

### E. Method E (Pay Item No. 430S-E)

This payment method shall include all the work performed for "P.C. Concrete Laydown Curb" complete, at the unit bid price. The unit bid price shall include full compensation for excavation, preparation of the subgrade, furnishing and placing all concrete and base material, reinforcing steel, dowels, expansion joint material, curing material, backfill and for all other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work

## F. Method F (Pay Item No. 430S-F)

This payment method includes all the work performed for "P.C. Concrete Laydown Curb" complete, at the unit bid price. The unit bid price shall include full compensation for fine grading, furnishing and placing concrete and reinforcing steel, dowels, expansion joint material, curing material, backfill and for other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under one of the following:

Pay Item No. 430S-A:	P.C. Concrete Curb and Gutter (Excavation)	Per Lineal Foot.
Pay Item No. 430S-B:	P.C. Concrete Curb and Gutter (Fine Grading)	Per Lineal Foot.
Pay Item No. 430S-C:	P.C. Concrete Curb (Excavation)	Per Lineal Foot.
Pay Item No. 430S-D:	P.C. Concrete Curb (Fine Grading)	Per Lineal Foot.
Pay Item No. 430S-E:	P.C. Concrete Laydown Curb (Excavation)	Per Lineal Foot.
Pay Item No. 430S-F	P.C. Concrete Laydown Curb (Fine Grading)	Per Lineal Foot

#### End

#### **SPECIFIC** CROSS REFERENCE MATERIALS

Specification Item No. 430S, "P.C. Concrete Curb and Gutter"

City of Austin Standard Specifications

Designation Description

Previous Versions: 12/09/08, 06/16/08, 11/13/07, 02/26/02, 04/17/86 and 05/23/00

Item No 130S
Item No 210S
Item No. 360S
Item No. 360S
Section 360S.4 of Item 360S
Section 360S.6 of Item 360S
Item No. 403S
Item No. 403S
Concrete Mixing and Placing
Concrete for Structures
Section 403S 7 of Item No. 403S
Concrete for Structures

Section 403S.7 of Item No. 403S (Table 4) Item No. 406S Reinforcing Steel

Item No. 408S Expansion Joint Materials

Item No. 409S Membrane Curing

Item No. 604S Seeding for Erosion Control

# City of Austin Standard Details

<u>Designation</u> <u>Description</u>

430S-1 Curb and Gutter Section

430S-3 Curb Expansion Joint Dowel Detail 430S-4 Concrete Backfill Under Curb & Gutter

430S-5 Reinforcing Bar Detail at Existing Curb and Gutter

## **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 430S, "P.C. Concrete Curb and Gutter"

# City of Austin Standard Specifications

City Ciritardini Ctani and Coccini Catani Ciric		
<u>Designation</u>	<u>Description</u>	
Item No. 301S	Asphalts, Oils and Emulsions	
Item No. 302S	Aggregates for Surface Treatments	
Item No. 340S	Hot Mix Asphaltic Concrete Pavement	
Item No. 431S	Machine Laid PCC Curb and Gutters	
Item No. 433S	P.C. Concrete Driveways	
Item No. 434S	P.C. Concrete Medians and Islands	
Item No. 436S	P.C. Concrete Valley Gutters	
Item No. 606S	Fertilizer	

# Item No. 432S Portland Cement Concrete Sidewalks

# 432S.1 Description

This item shall govern the construction of Portland cement concrete sidewalks (Standard Detail No. 432S-1), as herein specified, on an approved subgrade and in conformance with the lines, grades and details indicated on the Drawings or as established by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

## 432S.2 Submittals

The submittal requirements of this specification item include:

- A. Class A portland cement (p.c). concrete mix design,
- B. Type of Installation (i.e. Type I, Type II, etc.) and construction details (i.e. cushion layer, base, reinforcing steel, joints, curing membrane),
- C. Identification of the type, source, mixture, Pure Live Seed (PLS) and rate of application of the seeding.
- D. Number, manufacturer, model, construction, finish and installation details of streetscape appurtenances of bicycle racks, benches, chairs, trash receptacles, streetlights, tree wells and above grade tree planters [for sidewalks, 12 feet (3.66 meters) or wider].

## 432S.3 Materials

## A. Portland Cement Concrete

Portland cement concrete shall be Class A conforming to Specification Item No. 403S, "Concrete for Structures" or Specification Item No. 407S, "Fibrous Concrete".

## B. Reinforcement

Reinforcement shall conform to Specification Item No. 406S, "Reinforcing Steel" or Specification Item No. 407S, "Fibrous Concrete".

#### C. Expansion Joint Materials

Expansion joint materials shall conform to Specification Item No. 408S, "Expansion Joint Materials".

## D. Membrane Curing Compound

Membrane curing compound shall conform to Specification Item No. 409S, "Membrane Curing".

## **432S.4 Construction Methods**

The subgrade shall be excavated in accordance with Specification Item No. 111S, "Excavation", prepared in accordance with Specification Item No. 201S, "Subgrade Preparation", shaped to the lines, grades and cross section as indicated on the Drawings or as directed by the Engineer or designated representative and thoroughly compacted in accordance with Specification Item No. 201S. A granular cushion of a minimum thickness of 2 inches (50 mm) but maximum thickness of 5 inches (125 mm), composed of crusher screenings, gravel and sand, crushed rock or coarse sand,

shall be spread, wetted thoroughly, tamped and leveled. The granular cushion shall be moist at the time the Portland cement concrete is placed.

If the subgrade is undercut by more than 4 inches (100 mm) or the elevation of the natural ground is more than 4 inches (100 mm) below "top of subgrade", then a necessary backfill/embankment layer of an approved material shall be placed and compacted with a mechanical tamper. Hand tamping will not be permitted.

Where the subgrade is rock or gravel, 70 percent of which is rock; the 2-inch (50 mm) cushion need not be used. The Engineer or designated representative will determine if the subgrade meets the above requirements.

Sidewalk forms shall be constructed of metal or well-seasoned wood not less than 2 inches (50 mm) in thickness, with a section satisfactory to the Engineer or designated representative. The forms shall be clean, straight, and free from warp with a depth equal to the thickness of the finished work. All forms shall be securely staked to line and grade and maintained in a true position during the deposition of Portland cement concrete. Before p.c. concrete is placed, the forms shall be thoroughly oiled with a light form oil.

Expansion joint material 3/4 inch (19 mm) thick, shall be provided where the new construction abuts an existing structure, sidewalk or driveway. Similar expansion material shall be placed around all obstructions protruding through the sidewalk. The expansion joint material shall be placed vertically and shall extend the full depth of the p.c. concrete. Maximum spacing of expansion joints shall be 40 feet (12 meters) as indicated on the Drawings or as directed by the Engineer or designated representative. Weakened plane joints shall be spaced at 5 feet (1.5 meters) on center. Normal dimensions of the weakened plane joints shall be 1/4 inch wide and 3/4 inch deep (6 mm wide and 19 mm deep). All joints shall be constructed perpendicular (90 degrees) to the centerline of walk and shall match any previously placed concrete joints. For sidewalks with widths exceeding 6 feet (1.83 meters) longitudinal weakened-plane tooled joints shall be provided as indicated on the Drawings or as directed by the Engineer or designated representative.

Reinforcement for sidewalks shall consist either of polypropylene fibrillated fibers or  $6" \times 6" \times W1.4 \times W1.4$  (150mm x 150mm x MW9 x MW9) welded wire fabric or one layer #3 (10M) reinforcing bars, placed no more than 18 inches (450 mm) on center both directions. All reinforcement shall be accurately placed at slab mid-depth, equidistant from the top and bottom of the p.c. concrete and held firmly in place by means of bar supports of adequate strength and number that will prevent displacement and keep the steel at its proper position during the placement of the p.c concrete. In no instance shall the steel be placed directly on the subgrade or sand cushion layer.

Prior to placement of the concrete, the reinforcement installation shall be inspected by the Engineer or designated representative to insure conformance with the drawings, specifications and this item. In addition care shall be exercised to keep all steel in its proper position during placement of the p.c. concrete. If during placement of the concrete, the reinforcement is observed to loose bar support, float upward or move in any direction, the placement shall be stopped until corrective action is taken.

Splices in wire fabric shall overlap sufficiently to allow two pairs of transverse wires to be tied together and no splice of less than 6 inches (150 mm) will be permitted. Splices in the #3 (10M) bars shall have a minimum lap of 12 inches (300 mm).

Where driveways cross sidewalks, additional reinforcing shall be placed in the sidewalk as indicated on the Drawings.

Portland cement concrete shall be placed in the forms and spaded, tamped and thoroughly consolidated until it covers the entire surface with a monolithic finish. The top surface shall be floated and troweled to a uniform smooth surface; then finished with a broom or wood float to a gritty texture unless indicated otherwise on the Drawings or as directed by the Engineer or designated representative. The outer edges and joints shall be rounded with approved tools to a 432S 01/04/10

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Portland Cement Concrete Sidewalks

1/4-inch (6 mm) radius. Care will be exercised to prevent loss of dummy joints or rounded edges when applying the brush finish.

Portland cement concrete sidewalk ramps shall be formed to produce a finished surface with detectable warnings (Standard Detail 432S-2A) in accordance with the requirements of the American Disabilities Act and Texas Accessibility Standards (TAS), including Sections 4.29.2 and A4.29.2. The p.c. concrete sidewalk ramps shall be constructed in accordance with appropriate City of Austin Standard Details (Standard Details 432S-3, 432S-3A through 432S-3H, 432S-5, 432S-5A, 432S-5B, etc.).

Detectable warning for the ramps shall consist of raised truncated domes with a diameter of nominal 0.9 inch (23 mm), a height of nominal 0.2 inch (5 mm) and center-to-center spacing of nominal 2.35 inches (60 mm) and shall contrast visually with adjoining surfaces, either light on dark or dark-on-light. The material used to provide contrast shall be an integral part of the walking surface.

When indicated on the Drawings or as directed by the Engineer or designated representative, the construction of the sidewalk ramp shall include the installation of interlocking concrete paving units (Standard Specification Item No. 480S, "Concrete Paving Units"). The concrete paving units shall be constructed in accordance in accordance with Standard Specification Item No. 485S, "Concrete Paving Units for Sidewalk Ramps) and appropriate City of Austin Standard Details (Standard Details 432S-2A, 432S-3, 432S-3A through 432S-3H, 432S-5, 432S-5A and 432S-5B).

At the proper time after finishing, the surface shall be protected by a membrane, compound curing agent or by wetted cotton or burlap mats, conforming to Item No.409S, "Membrane Curing". The sides of the p.c. concrete shall be cured in the forms. If the forms are removed during the curing process, the curing shall be continued by the placement of fill against the exposed concrete edges or by other procedures conforming to Item No. 410S, "Concrete Structures". The top 4 inches (100 mm) of fill shall be clean topsoil conforming to Item No. 604S, "Seeding for Erosion Control".

Existing sidewalk that is scheduled for removal and replacement shall be removed and the underlying material shaped to the lines, grades and cross section as indicated in the drawings or as directed by the Engineer or designated representative. The removal and/or relocation of obstructions, including but not limited to signs, trash cans and benches on concrete pads, abandoned manholes, sprinkler control valves and landscaping, shall be performed, as indicated on the drawings, in a manner acceptable to the Engineer or designated representative. Removal and/or relocation of obstructions will be considered incidental work to this item and will not be paid for directly.

Existing PVC pipe drains in and behind curb shall be removed and replaced as required in new sidewalk and/or curb and gutter. In areas of proposed sidewalk construction, where curb and gutter is to remain in place, existing PVC pipe shall be cut far enough behind the back of curb to allow sufficient room for joint fittings to connect to new or salvaged PVC pipe.

The Contractor shall be responsible for removing and replacing mailboxes that are located in the construction area, while assuring that mail delivery will not be interrupted as a result of the construction activities. Mailboxes shall not be laid on the ground.

All necessary excavation, filling and grading of the slopes adjacent to the completed concrete sidewalks will be considered incidental work pertaining to this item and will not be paid for directly. The adjacent excavation and grading of the slopes shall be done in a manner acceptable to the Engineer or designated representative.

## 432S.5 Streetscape Furniture Installation Requirements

A. General General

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Bicycle racks, benches and chairs, trash receptacles, tree wells and above grade tree wells and planters shall only be installed in sidewalks that are 12 feet (3.66 meters) or wider. When installation is indicated on the Drawings or directed by the Engineer or designated representative, these items shall be permanently installed as indicated in Standard Details 710S-4 and 710S-5; 432S-9B; 432S-7C, and 432S-7F; and 432S-8B. Above grade tree wells shall be installed in conformance with Standard Detail 432S-7E, while above grade tree planters shall be installed in conformance with Standard Detail Nos. 432S-7D and 432S-7G.

## B. Location Requirements

#### 1. Benches.

Benches shall be placed either perpendicular to the curb with the center of the bench on line with trees and light poles and facing toward the building entry, or parallel to the building and within 6" (150 mm) of the building wall, facing out to the street.

Bench siting shall be in conformance with Standard Detail No. 432S-9C in 12' (3.6 M) or wider sidewalks and Standard Detail No. 432S-9D in sidewalks of width between 12' (3.6 M) and 18' (5.4 M).

## 2. Bike Racks.

Bike racks are to be placed perpendicular to the curb with the centerline of the rack on line with trees and light poles.

Bike rack siting shall be in conformance with Standard Detail No. 710S-6A in 12' (3.6 M) or wider sidewalks and Standard Detail No. 710S-6B in sidewalks of width between 12' (3.6 M) and 18' (5.4 M).

## 3. Trash Receptacles.

Trash receptacles shall either be placed along the curb, with the center line of the receptacle on line with the trees and light poles, or shall be located at the building entry in alignment with the structural bay system of the building. If located at the entry there shall be no more than 1 foot (300 mm) clearance between the receptacle and the building wall.

Trash receptacle siting adjacent to curb ramps within an intersection shall be in conformance with Standard Detail No. 432S-8C in 12' (3.6 M) or wider sidewalks.

## P432S.6 Pedestrian Railing

When a pedestrian railing installation is required along sidewalks for pedestrian protection as indicated on the Drawings or directed by the Engineer or designated representative, this type of pedestrian railing shall be permanently installed in conformance with one of the following designated Standard Details: 707S-1, 707S-2, 707S-3 or 707S-4.

When a pedestrian railing installation is required along portions of sidewalks identified as 'ramps' for ADA accessibility purposes as indicated on the Drawings or directed by the Engineer or designated representative, this type of pedestrian railing shall be permanently installed in conformance with one of the following designated Standard Details: 707S-2, 707S-3 or 707S-4.

## 432S.7 Measurement

Accepted work performed as prescribed by this item will be measured by the square foot (square meter: 1 square meter is equal to 10.764 square feet) of surface area of "Concrete Sidewalk".

Accepted work performed as prescribed by "Sidewalk Ramps" will be measured per each for the type of ramp indicated on the Drawings.

Accepted work performed as prescribed by "Streetscape Appurtenances" will be measured per each for the type of appurtenance indicated on the Drawings.

Accepted work performed as prescribed by "Pedestrian Railing" will be measured per lineal foot of the type of railing indicated on the Drawings.

# 432S.8 Payment

The work performed as prescribed by this item for concrete sidewalk will be paid for at the unit bid price per square foot for "Concrete Sidewalk" and/or "Sidewalks Reconstruction"; per each for "Concrete Sidewalk Ramps" and "Streetscape Appurtenances" or per lineal foot for "Pedestrian Railing".

The unit bid price for new sidewalk shall include full compensation for excavating and/or removal and/or relocating obstructions, vegetating adjacent areas disturbed by sidewalk construction, preparing the subgrade; for furnishing and placing all materials including cushion material, all reinforcement, bar supports, joints, expansion joint materials, and for any other materials, manipulations, labor, tools, equipment, finishing, curing and incidentals necessary to complete the work.

The unit bid price for sidewalk reconstruction shall include full compensation for excavating and/or removal of existing sidewalk and other obstructions, relocating obstructions, replacing PVC drain pipe, re-vegetating adjacent areas disturbed by sidewalk construction, preparing the subgrade; for furnishing and placing all materials including cushion material, all reinforcement, bar supports, joints, expansion joint materials, and for any other materials, manipulations, labor, tools, equipment, finishing, curing and incidentals necessary to complete the work.

The unit bid price for ramps shall include full compensation for preparing the subgrade when not included as a separate item; for furnishing and placing all materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work. All necessary excavation, filling and grading of the slopes adjacent to the completed concrete paver units will be included in the unit price bid for the item of construction in which this item is used, unless included as a separate pay item in the Contract bid form.

The unit bid price for streetscape appurtenances shall include full compensation for the individual item (i.e. bench, chair, bicycle rack, trash receptacle, street light or above grade tree planter), as well as the removal of existing sidewalk, preparation of footings, furnishing and placing all materials, manipulation and finishing, labor, tools, equipment and incidentals necessary to complete the work.

The unit bid price for pedestrian railing shall include full compensation for the complete installation of the specific pedestrian railing including but not limited to preparation of footings or curb, furnishing and placing all materials, manipulation and finishing, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under one of the following:

New Sidewalks	
Pay Item 432S-4: New P.C. Concrete Sidewalks, 4 Inch thickness Per	Square Foot.
Pay Item 432S-5: New P.C. Concrete Sidewalks, 5 Inch thickness Per	Square Foot.
Pay Item 432S-6: New P.C. Concrete Sidewalks, 6 Inch thickness Per	Square Foot.
Pay Item 432S-7: New P.C. Concrete Sidewalks, 7 Inch thickness Per	Square Foot.
Sidewalks Reconstruction	
Pay Item 432SR-4: Reconstruct Concrete Sidewalks to 4 Inch thickness, including removal of existing sidewalk Per	Square Foot.
Pay Item 432SR-5: Reconstruct Concrete Sidewalks to 5 Inch thickness,	
g g	Square Foot.
Pay Item 432SR-6: Reconstruct Concrete Sidewalks to 6 Inch thickness,	
· · · · · · · · · · · · · · · · · · ·	Square Foot.
Pay Item 432SR-7: Reconstruct Concrete Sidewalks to 7 Inch thickness, including removal of existing sidewalk Per	Square Foot.
<u>Ramps</u>	
Pay Item 432S - RP-1: P.C. Sidewalk Curb Ramp with Pavers (Type I)	Per Each.
Pay Item 432S-RP-1A: P.C. Sidewalk Curb Ramp with Pavers (Type IA)	Per Each.
Pay Item 432S-RP-1B: P.C. Sidewalk Curb Ramp with Pavers (Type IB)	Per Each.
Streetscape Appurtenances	
Pay Item 432S-SAC-1 Streetscape Bench ( inches in length)	Per Each.
Pay Item 432S-SAC-2 Streetscape Chair	Per Each.
Pay Item 432S-SAC-3 Streetscape Bicycle Rack	Per Each.
Pay Item 432S-SAC-4 Streetscape Trash Receptacle	Per Each.
Pay Item 432S-SAC-5 Streetscape Street Light	Per Each.
Pay Item 432S-SAC-7C Streetscape Tree Well for Concrete Sidewalks	Per Each.
Pay Item 432S-SAC-7D Streetscape Above Grade Tree Planters with Benc	h Per Each.
Pay Item 432S-SAC-7E Streetscape Above Grade Tree Well with Seat	Per Each.
Pay Item 432S-SAC-7F Streetscape Tree Well without Grate	Per Each.
Pay Item 432S-SAC-7G Streetscape Above Grade Galvanized Steel Tree F	Planters
	Per Each
Pedestrian Railing	
Pay Item 432S-PRC-1 Pedestrian Railing (Standard 707S-1)	Per LF.
Pay Item 432S-PRC-2 Pedestrian ADA Railing – Option 1 (Standard 707S-2	•
Pay Item 432S-PRC-3 Pedestrian ADA Railing – Option 2 (Standard 707S-3	<ol><li>Per LF.</li></ol>

# End

<u>SPECIFIC</u> CROSS REFERENCE MATERIALS	
Specification 4325 "P. C. Concrete Sidewalks"	

Pay Item 432S-PRC-4 Pedestrian ADA Railing – Option 3 (Standard 707S-4) Per LF.

City of Austin Standard Specifications		
<u>Designation</u>	<u>Description</u>	
Item No. 111S	Excavation	
Item No. 201S	Subgrade Preparation	
Item No. 403S	Concrete for Structures	
Item No. 406S	Reinforcing Steel	
Item No. 407S	Fibrous Concrete	
Item No. 408S	Expansion Joint Materials	
Item No. 409S	Membrane Curing	
Item No. 410S	Concrete Structures	
Item No. 480S	Concrete Paving Unit	
Item No. 485S	Concrete Paving Units for Sidewalk Ramps	
Item No. 604S	Seeding for Erosion Control	

# City of Austin Standard Details

Designation	
432S-1	<u>Description</u> Sidewalk
432S-2A	Detectable Warning-Paver
432S-3	Type I Curb Ramps-Full Intersection
432S-3A	Type I Curb Ramps-Full Intersection
432S-3B	Type IA/IB Curb Ramps-Full Intersection
432S-3C	Type IA/IB Curb Ramps-T Intersection
432S-3D	Combined Curb Ramps-Full Intersection
432S-3E	Combined Curb Ramps-T Intersection
432S-3F	Combined Sidewalk Curb Ramp with Pavers
432S-3G	Combined Sidewalk Curb Ramp with Pavers within Limited
	ROW
432S-3H	Type I Curb Ramps within PC/PT of Curb and Gutter
432S-5	Type I Sidewalk Curb Ramp
432S-5A	Type IA Sidewalk Curb Ramp
432S-7C	Tree Well for New Trees Planted Within Concrete Sidewalk 3.6 M (12') or Greater
432S-7D	Above Grade Tree Planters
432S-7E	Above Grade Tree Well with Bench
432S-7F	Tree Well Without Grate
432S-7G	Above Grade Galvanized Steel Tree Planters
432S-8B	Trash Receptacle Installation in Concrete Sidewalk
432A-8C	Furnishing Location in 12' (3.6 M) or greater Trash
432A-0C	Receptacle Siting
432S-9B	Bench/Chair Installation in Sidewalks
432S-9C	Furnishing Location in 12' (3.6 M) or greater Sidewalks- Bench Siting
432S-9D	Furnishing Location in Greater than 12' (3.6 M) or Less than 18' (5.4 M) Sidewalks-Bench Siting
707S-1	Pedestrian Railing
707S-2	Pedestrian ADA Railing – Option 1
707S-3	Pedestrian ADA Railing – Option 2
707S-4	Pedestrian ADA Railing – Option 3
710S-4	Bicycle Rack Installation in Concrete Sidewalks (Alternate 1)
710S-4 710S-5	Bicycle Rack Installation in Concrete Sidewalks (Alternate 1)
7 100-0	Dicycle Nach installation in College Sidewaiks (Alternate 2)

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710S-6A Furnishing Location in 12' (3.6 M) or greater Sidewalks-

Bicycle Rack Siting

710S-6B Furnishing Location in Greater than 12' (3.6 M) or Less than

18' (5.4 M) Sidewalks-Bicycle Rack Siting

American Disabilities Act, Federal Register; Volume 56, No. 144; July 26, 1991

ADA Accessibility Guidelines For Building And Facilities

<u>Designation</u> <u>Description</u>

Section 4.29 Detectable Warnings on Walking Surfaces
Section A4.29.2 Detectable Warnings on Walking Surfaces
Architectural Barriers; Texas Civil Statutes, Article 9102; June 14, 1995

Texas Accessibility Standards (TAS)

Designation

Description

Section 4.29 Detectable Warnings on Walking Surfaces
Section A4.29.2 Detectable Warnings on Walking Surfaces

## **RELATED** CROSS REFERENCE MATERIALS

City of Austin Standard Contract Documents

<u>Designation</u> <u>Description</u>

00700 General Conditions 01500 Temporary Facilities

01550 Public Safety and Convenience

City of Austin Utilities Criteria Manual Designation Description

Section 5.2.3 Utility Adjustments For Roadway Construction Projects

City of Austin Standard Specifications
Designation Description

Item No. 102S Clearing and Grubbing

Item No. 104S Removing Portland Cement Concrete

Item No. 110S Street Excavation Item No. 132S Embankment

Item No. 203S Lime Treatment for Materials In Place

Item No. 204S Portland Cement Treatment for Materials In Place

Item No. 230S Rolling (Flat Wheel)
Item No. 232S Rolling (Pneumatic Tire)
Item No. 234S Rolling (Tamping)
Item No. 236S Rolling (Proof)
Item No. 360S Concrete Pavement

Item No. 402S Controlled Low Strength Material Item No. 404S Pneumatically Placed Concrete

Item No. 405S Concrete Admixtures

Item No. 411S Surface Finishes for Concrete

Previous Versions: 11/13/07, 03/12/07, 09/18/06, 02/26/02, 02/21/01, 05/23/00 and 05/16/94

Item No. 433S P. C. Concrete Driveways

# 433S.1 Description

This item shall govern construction of Portland Cement (p.c.) concrete driveways, as herein specified, on an approved subgrade, in conformity with the lines, grades and cross section indicated on the Drawings, identified in Standard Detail Series 433S, or as established by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 433S.2 Submittals

The submittal requirements of this specification item include:

- A. Class A and/or Item 360S p.c. concrete mix design,
- B. Type of Installation (i.e. Type I, Flared Type I, Type II, etc.) and construction details (i.e. cushion layer, base, reinforcing steel, joints, curing membrane),
- C. Identification of the type, source, mixture, Pure Live Seed (PLS) and rate of application of the seeding.

## 433S.3 Materials

#### A. Concrete

The Portland Cement Concrete for a Type I driveway (Standards 433S-1 and 433S-1A shall conform to Class A, Section 403S.7 (Table 4) of Standard Specification Item No. 403S, "Concrete for Structures." The Portland Cement Concrete for a Type II driveway (Standard 433S-2) shall conform to a normal concrete mix design for concrete pavement, Section 360S.4(2) of Standard Specification Item No. 360S, "Concrete Pavement".

## B. Reinforcing Steel

Reinforcing steel and welded wire fabric shall conform to Standard Specification Item No. 406S, "Reinforcing Steel".

# C. Expansion Joint Materials

Expansion joint materials shall conform to Standard Specification Item No. 408S, "Expansion Joint Materials".

# D. Membrane Curing Compound

Membrane curing compound shall conform to Standard Specification Item No. 409S, "Membrane Curing".

# E. Cushion Layer

The Cushion layer shall consist of crusher screenings, gravel or coarse sand.

and 05/16/94

#### 433S.4 Construction Methods

All forms and forming, placement of reinforcement, placement of concrete, form removal, finishing and curing shall conform to Standard Specification Item No. 410S, "Concrete Structures".

# A. Subgrade Preparation

The subgrade shall be excavated, prepared and shaped to the lines, grades and cross sections indicated on the Drawings or as directed by the Engineer or designated representative. The subgrade shall be thoroughly compacted in accordance with Standard Specification Item No. 201S, "Subgrade Preparation". A 2-inch (50-mm) minimum compacted thickness cushion shall be spread, wetted thoroughly, tamped and leveled. The cushion shall be moist at the time the p.c. concrete is placed.

If the subgrade is undercut or natural ground is located below the top of subgrade, the necessary backfill material shall conform with Standard Specification Item 130S, "Borrow" and shall be compacted with a mechanical tamper. Hand tamping will not be permitted.

Where the subgrade material consists of gravel or includes 70 percent of rock, the 2-inch (50-mm) cushion layer may not be required. The Engineer or designated representative will determine if the subgrade meets the above requirements.

# B. Forms

Forms shall be of metal, well-seasoned wood or other approved material of a section satisfactory to the Engineer or designated representative. Wood forms shall not be less than 2 inches (50 mm) nominal thickness for straight runs and 1-inch (25-mm) nominal thickness for curved runs. Forms shall be a section satisfactory to the Engineer or designated representative and clean, straight, free from warp and of a depth equal to the thickness of the finished work.

All forms shall be securely staked to line and grade and maintained in a true position during the placement of p.c. concrete.

## C. Joints

Joints shall be of the type and spacing shown on the Drawings. Expansion joint material, 3/4 inch (19 mm) thick, shall be provided where the new construction abuts the existing sidewalks or driveways or as directed by the Engineer or designated representative. The expansion joint material shall be placed vertically and shall extend the full depth of the p.c. concrete. Similar expansion material shall be placed around all obstructions protruding through the driveway. Weakened plane joints shall be located on 10-foot (3-meter) centers or as directed by the Engineer or designated representative. Normal dimensions of the weakened plane groove joints shall be 1/4-inch (6.25-mm) wide and 3/4 inch (19 mm) deep.

# D. Reinforcement

Reinforcement for Type I driveways shall consist of 1 layer of 6 x 6 by W 1.4 x W 1.4 (150 x 150 by MW9 x MW9) wire fabric or No. 3 (10 M) bars placed not more than 18 inches (450 mm) on center, both directions. Reinforcement for Type II driveways shall consist of 1 layer of layer of No. 4 (13M) bars placed no more than 18 inches (450 mm) on center, both directions.

Previous Versions: 11/13/07, 03/12/07, 09/18/06, 02/26/02, 02/21/01, 05/23/00 and 05/16/94

All reinforcements shall be accurately placed equidistant from the top and bottom of the p.c. concrete slab and held firmly in place by means of bar supports of adequate strength and number that will prevent displacement and keep the steel at its proper position. In no instance shall the steel be placed directly on the subgrade or sand cushion layer.

Prior to placement of the concrete, the reinforcement installation shall be inspected by the Engineer or designated representative to insure conformance with the drawings, specifications and this item. In addition, care shall be exercised to keep all steel in its proper position during the placement of p.c. concrete. If during placement of the concrete, the reinforcement is observed to loose bar support, float upward or move in any direction, the placement shall be stopped until corrective action is taken.

Splices in wire fabric shall overlap sufficiently to allow two pairs of transverse wires to be tied together and no splice of less than 6 inches (150 mm) will be permitted. Splices in the No. 3 (10 M) and No. 4 (13M) bars shall have a minimum lap of 12 inches (300 mm).

# E. P.C. Concrete Placement and Finishing

The p.c. concrete shall be placed in the forms and spaced, tamped and thoroughly compacted until it entirely covers the surface and has a monolithic finish. The top surface shall be floated and troweled to a uniform smooth surface, then finished with a broom or wood float to a gritty texture unless otherwise indicated on the Drawings. The outer edges and joints shall be rounded with approved tools to a 1/4-inch (6.3 mm) radius. Care shall be exercised to prevent loss of dummy joints or rounded edges when applying the broom finish.

## F. Curing

At the proper time after finishing, the surface shall be protected by a membrane compound curing agent in conformance with Standard Specification Item No. 409S, "Membrane Curing" or by wetting cotton or burlap mats. Either method shall be subject to approval by the Engineer or designated representative.

Traffic shall be barricaded from using the driveway for a minimum of 4 days after initial placing and may be opened to traffic only with approval of the Engineer or designated representative.

## G. Incidental Work

All necessary excavation, filling and grading of the slopes, adjacent to the completed pcc driveways, will be considered incidental work pertaining to this item and will not be paid for directly.

The adjacent excavation and grading of the slopes shall be done with topsoil conforming to Standard Specification Item No. 130S, "Borrow". When turf is to be established, the preparation of the seedbed shall conform to Standard Specification Item No. 604S, "Seeding for Erosion Control", in a manner acceptable to the Engineer or designated representative.

## 433S.5 Measurement

Accepted work performed as prescribed by this item will be measured by the square foot (square meters: 1 square meter equals 10.764 square feet) of surface area of the specific type of p.c. concrete driveway.

## 433S.6 Payment

The work performed as prescribed by this item will be paid for at the unit bid price per square foot for "Concrete Driveways". The unit bid price shall include full compensation for preparation of the subgrade; furnishing and placing all materials, including cushion layer, all reinforcing steel, bar supports and expansion joint materials; and any other materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item No. 433S-A: Type I P.C. Concrete Driveway Per Square Foot.

Pay Item No. 433S-B: Flared Type I P.C. Concrete Driveway Per Square Foot.

Pay Item No. 433S-C: Type II P.C. Concrete Driveway Per Square Foot.

#### End

# SPECIFIC CROSS REFERENCE MATERIALS Specification Item No. 433S, "P.C. Concrete Driveways"

## City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 130S	Borrow
Home No. 2010	Cubarada D

Item No. 201S Subgrade Preparation Item No. 360S Concrete Pavement

Item No. 403S Concrete for Structures, Section 403S.7 Item No. 403S Concrete for Structures, Table 4: Classes

of Concrete

Item No. 406S Reinforcing Steel

Item No. 408S Expansion Joint Materials

Item No. 409S Membrane Curing Item No. 410S Concrete Structures

Item No. 604S Seeding for Erosion Control

# City of Austin Standard Details

<u>Designation</u> <u>Description</u>

No. 433S-1 Type I Driveway (1 & 2 Family Residential Use Only)

No. 433S-1A Flared Type I Driveway (1 & 2 Family Residential Use Only)

No. 433S-2 Type II Driveway

# **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 433S, "P.C. Concrete Driveways"

# City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 430S	P.C. Concrete Curb and Gutter
Item No. 431S	Machine Laid PCC Curb and Gutter
Item No. 432S	Concrete Sidewalks
Item No. 434S	P.C. Concrete Medians and Islands
Item No. 436S	P.C. Concrete Valley Gutters
Item No. 470S	Curb Cuts for Sidewalk Ramps and Driveways
Item No. 606S	Fertilizer

# Item No. 434S P.C. Concrete Medians and Islands

## 434S.1 Description

This item shall govern construction of Portland cement concrete traffic islands and medians in accordance with these specifications and in conformity to the lines, grades, sections and details indicated on the Drawings or as established by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 434S.2 Submittals

The submittal requirements of this specification item include:

- A. Class A p.c. concrete mix design,
- B. Type of Installation (i.e. Median or Island) and construction details (i.e. cushion layer, base, reinforcing steel, joints, curing membrane).

## 434S.3 Materials

# A. Portland Cement (p.c.) Concrete

The p.c. concrete shall conform to Class A Concrete, Section 403S.7 (Table 4) of Standard Specification Item No. 403S, "Concrete for Structures".

## B. Reinforcing Steel

Reinforcing steel and welded wire fabric shall conform to Standard Specification Item No. 406S, "Reinforcing Steel".

# C. Expansion Joint Materials

Preformed expansion joint materials shall conform to Standard Specification Item No. 408S, Expansion Joint Materials".

# D. Membrane Curing Compound

Membrane curing compound shall conform to Standard Specification Item No. 409S. "Membrane Curing".

## E. Admixtures

Admixtures shall conform to Standard Specification Item No. 405S, "Concrete Admixtures".

## F. Aggregate Cushion

Cushion layer shall consist of crusher screening, gravel, sand, crushed stone or "Flexible Base" materials (Standard Specification Item No. 210S) approved by the Engineer or designated representative.

## 434S.4 Construction Methods

All forms and forming, placement of reinforcement, placement of concrete, form removal, finishing and curing shall conform to Standard Specification Item No. 410S, "Concrete Structures".

## A. PCC Mix Design

The p.c. concrete shall conform to an approved design mix for a Class A p.c. concrete on file with the City or proposed Class A mix designs with the necessary test data may be submitted for approval by the Engineer or designated representative.

High range water reducing admixtures conforming to Standard Specification Item No. 360, "Concrete Pavements" may be used when approved by the Engineer or designated representative.

# B. Subgrade and Base Preparation

The subgrade shall be excavated, prepared and shaped to the lines, grades and cross section indicated on the Drawings or as directed by the Engineer or designated representative, and shall be thoroughly compacted conforming to Standard Specification Item No. 201S, "Subgrade Preparation". A cushion layer, 2 inches (50 mm) minimum thickness, shall be spread, wetted thoroughly, tamped and leveled. The cushion shall be moist at the time the p.c. concrete is placed.

## C. Forms

Forms shall be of metal, well-seasoned wood or other approved material. The length of the forms shall be a minimum of 10 feet (3 meters). Flexible or curved forms shall be used for curves of 100-foot (30-meter) radius or less. Wood forms for straight sections shall be not less than 2 inches (50 mm) in thickness. Forms shall be a section, that is satisfactory to the Engineer or designated representative, and shall be clean, free from warp, and of a depth equal to the finished work. All forms shall be securely staked to line and grade and maintained in a true position during the placement of the p.c. concrete and, if required, forms shall be thoroughly oiled with a light form oil prior to p.c. concrete placement. If the adjacent existing asphalt pavement is damaged during construction, it shall be restored to its original condition.

#### D. Reinforcement

Reinforcement shall conform to the details indicated on the Drawings or the directions of the Engineer or designated representative. All reinforcement shall be accurately placed at slab mid-depth, equidistant from the top and bottom of the p.c. concrete, and held firmly in place by means of bar supports of adequate strength and number that will prevent displacement and keep the reinforcement in its proper position during the placement of the p.c. concrete. In no instance shall the steel be placed directly on the subgrade or sand cushion layer.

Prior to placement of the concrete, the reinforcement installation shall be inspected by the Engineer or designated representative to insure conformance with the drawings, specifications and this item. In addition care shall be exercised to keep all steel in its proper position during placement of the p.c. concrete. If during placement of the concrete, the reinforcement is observed to loose bar support, float upward or move in any direction, the placement shall be stopped until corrective action is taken.

## E. Joints

Joints shall be of the type and spacing shown on the Drawings. Expansion joint material, 3/4 inch (19 mm) in thickness, shall be placed as indicated on the Drawings with a maximum spacing of 40 feet (12 meters) or as directed by the Engineer or designated representative. Expansion joints shall be placed on the same alignment when adjacent to a Portland Cement concrete payement. Weakened plane joints shall be made 3/4 inch (19 mm) deep and equally spaced, normally at 5 foot (1.5 meters) on centers or as directed by the Engineer or designated representative. Expansion joints shall be required between the curb and median p.c. concrete.

## F. P.C. Concrete Placement and Finishing

The p.c. concrete shall be placed in the forms to the depth indicated on the Drawings. and properly consolidated and until mortar entirely covers the surface and forms a monolithic finish. If a vibrator is used, care shall be taken not to leave it in one location long enough to induce segregation. The top surface shall be floated and troweled to a uniform smooth surface, then finished with a camel hairbrush or wood float to a gritty texture. The outer edges shall be rounded with approved tools to the radii indicated on the Drawings.

When the ambient air temperature is above 85°F (30°C), an approved retarding agent will be required in all p.c. concrete. The maximum temperature of all p.c. concrete placed shall not exceed 95°F (35°C), unless High Range Water Reducer Admixtures are used.

# G. Curing

Immediately after finishing the p.c. concrete median or island, the pcc surface shall be protected by a membrane-compound curing agent conforming with Standard Specification Item No. 409S, "Membrane Curing". The curing procedures shall be acceptable to the Engineer or designated representative.

## 434S.5 Measurement

Accepted work as prescribed by this item will be measured by the square foot (square meter: 1 square meter equals 10.764 square feet) of surface area of p.c concrete medians and/or p.c. concrete island, complete in place.

## 434S.6 Payment

The work performed as prescribed by this item will be paid for at the unit bid price per square foot for "P.C. Concrete Medians and Islands". The unit bid price shall include full compensation for preparation of the subgrade; finishing and placing all materials, including all reinforcing steel, welded wire fabric; bar supports and any other materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item No. 434S: \_\_Inch P.C. Concrete Medians and Islands Per Square Foot.

## End

# **SPECIFIC** CROSS REFERENCE MATERIALS

Specification Item No. 434S, "P.C. Concrete Medians and Islands"

# City of Austin Standard Specifications

Designation	Description
Item No. 201S	Subgrade Preparation
Item No. 210S	Flexible Base
Item No. 403S	Concrete for Structures
Section 403S.7: Item No. 403S	Table 4: Classes of Concrete
Item No. 405S	Concrete Admixtures
Item No. 406S	Reinforcing Steel
Item No. 408S	Expansion Joint Materials
Item No. 409S	Membrane Curing
Item No. 410S	Concrete Structures

# **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 434S, "P.C. Concrete Medians and Islands"

# City of Austin Standard Specifications

Oity of Austin Otandard Opcon	neations
<u>Designation</u>	<u>Description</u>
Item No. 360	Concrete Pavement
Item No. 430S	P.C. Concrete Curb and Gutter
Item No. 431S	Machine Laid PCC Curb and Gutter
Item No. 432S	P.C. Concrete Sidewalks
Item No. 433S	P. C. Concrete Driveways
Item No. 434S	P.C. Concrete Medians and Islands
Item No. 436S	P.C. Concrete Valley Gutters
Item No. 470S	Curb Cuts for Sidewalk Ramps and Driveways

Item No. 504S Adjusting Structures

# 504S.1 Description

This item shall govern the removal and replacement of surfacing, furnishing of materials, adjusting and/or repositioning existing structures, valve boxes, pull boxes, survey monument boxes and water meters in accordance with these specifications to the locations or elevations indicated on the Drawings or as directed by the Engineer or designated representative. This item shall also govern any pumping, bailing and drainage required to complete the Work and Standard Specification Item No. 509S, "Excavation Safety Systems" for trench walls when indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text the inch-pound units are given preference followed by SI units shown within parentheses

#### 504S.2 Submittals

The submittal requirements of this specification item include:

- A. Aggregate type, gradations and physical characteristics for the Portland cement concrete mix.
- B. Proposed proportioning of materials for the mortar mix.
- C. Type structures and proposed adjustment technique (lowering, raising, lateral displacement).
- D. Type structure, repair technique and materials to be furnished (new replacement or reuse of existing) Type of mixing plant and associated equipage including chart indicating the calibration of each cold bin

## 504S.3 Materials

Precast reinforced concrete rings and castings in good condition, which are removed from the structures to be adjusted, may be reused with the written approval of the Engineer or designated representative. Additional materials required shall conform to the details indicated on the Drawings.

# A. Portland Cement Concrete

The Portland cement concrete shall be Class A conforming to Standard Specification Item No. 403S, "Concrete for Structures".

## B. Mortar

Unless otherwise specified or approved by the Engineer or designated representative, the mortar for bedding castings shall consist of one (1) part Portland cement and three (3) parts sand, by volume based on dry materials. Sufficient water will be added to provide the desired consistency. The gradation of the fine aggregate shall meet the requirements for "Fine Aggregate" as given in Standard Specification Item No. 403S, "Concrete for Structures".

504S 02/24/10 Page 1 Adjusting Structures

## **504S.4 Construction Methods**

All adjustments shall be completed prior to the placement of the final surface.

Pull box and valve box components scheduled for reuse shall be carefully removed and the contact areas shall be cleaned of all mortar, concrete, grease and sealing compounds. Any items broken in the process of removal and cleaning shall be replaced in kind by the Contractor at its own expense.

If the adjustment involves slight lowering or raising a valve box or survey monument box, the outside shell of a slip or screw casing shall be excavated to its full length and adjusted to the proposed grade. Pipe castings shall be excavated to the depth required to cut from or weld a section to the casing as may be needed to adjust the ring to the proposed elevation. The ring shall be welded to the casing prior to pouring concrete around the casing.

If the adjustment involves a vertical (lowering or raising) or a horizontal reassignment of a water meter and the property owner's cut off valve, this work shall be completed in accordance with Standard Installation Details included in the City of Austin Standard Details Series (501S-1, 504S-3, 511S-13A, 511S-13B, etc.).

After the adjustments have been completed and cured, structures within the paved area shall be paved as indicated on the Drawings.

#### 504S.5 Measurement

The work performed and materials furnished as prescribed by this item as indicated shall be measured per each.

## 504S.6 Payment

The work performed, materials furnished and measures as provided above, will be paid by the unit bid price per each. The price shall include full compensation for furnishing all materials, handling, placing, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under one of the following:

Pay Item No. 504S-1WM:Adjusting Water Meters -Per EachPay Item No. 504S-1RM:Repositioning & Adjusting Water Meters -Per EachPay Item No. 504S-3G:Adjusting Gas Valve Boxes to Grade -Per EachPay Item No. 504S-3S:Adjusting Survey Monument Boxes to Grade -Per EachPay Item No. 504S-3W:Adjusting Water Valve Boxes to Grade -Per EachPay Item No. 504S-4PB:Adjusting Pull Boxes to Grade -Per Each

#### End

504S 02/24/10 Page 2 Adjusting Structures

# **SPECIFIC** CROSS REFERENCE MATERIALS

Specification 504S, "Adjusting Structures"

# City of Austin Standard Specifications Designation Description

Item No. 403S Concrete for Structures
Item No. 509S Excavation Safety Systems

## City of Austin Standard Details

<u>Designation</u> <u>Description</u>

No. 501S-1 Encasement Detail W/ Casing Spacers

No. 504S-3 Gas Valve Casing Adjustment

No. 511S-13A Water Valve Box Adjustment to Grade w/ Full Depth Concrete No. 511S-13B Water Valve Box Adjustment to Grade w/ Concrete and HMAC

# RELATED CROSS REFERENCE MATERIALS

Specification 504S, "Adjusting Structures"

# City of Austin Standard Specifications

<u>Designation</u>
Item No. 501S

<u>Description</u>
Jacking or Boring

Item No. 503S Frames, Grates, Rings and Covers

Item No. 505S Concrete Encasement and Encasement Pipe

Item No. 507S Bulkheads

Item No. 508S Miscellaneous Structures and Appurtenances

Item No. 511S Water Valves

## City of Austin Standard Details

Designation Description

No. 1100S-1 Casting Adjustment

No. 725S-1 Monument, Type A Survey Identification Marker No. 725S-2 Monument, Type B Survey Identification Marker No. 725S-3 Monument, Type C Survey Identification Marker

No. 725S-7 Survey Identification Marker Non-Traffic Construction Detail No. 725S-10 Survey Identification Marker Roadway Construction Detail

No. 725S-11 Adjustable Valve Box For Survey Monument

# Texas Department of Transportation: Standard Specifications for Construction and

Maintenance of Highways, Streets, and Bridges

<u>Designation</u> <u>Description</u>

Item No.421 Portland Cement Concrete

504S 02/24/10 Page 3 Adjusting Structures

# Item No. 505S Concrete Encasement and Encasement Pipe

## 505S.1 Description

This item shall govern the furnishing of materials and the methods of constructing a Portland cement concrete encasement or encasement pipe in a trench.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

## 505S.2 Submittals

The submittal requirements of this specification item include:

- A. Type, of pipe, construction methods and sequence,
- B. Aggregate types, gradations and physical characteristics for the Portland cement concrete mix,
- C. Proposed proportioning of materials for the mortar mix.

## 505S.3 Materials

## A. Portland Cement Concrete

The Portland cement concrete shall conform to Class D Concrete, Item No. 403S, "Concrete for Structures".

## B. Pipe

Portland Cement concrete pipe shall conform to ASTM C-76, Class III or better.

Corrugated Metal Pipe (CMP) shall conform to Section 510.2 (8) (o) of the City of Austin Standard Specification Item No. 510, "Pipe".

Steel Pipe shall conform to ASTM A134 with a minimum thickness of 3/8 inch (9.5 mm) for pipe with a diameter of 16 inches (400 mm) and greater.

## C. Grout

Grout shall consist of not less than 6 sacks Portland cement per cubic yard (335 kilograms Portland cement per cubic meter) and clean washed sand mixed with water. The grout shall have a consistency such that the grout will flow into and completely fill all voids. If allowed by the Engineer or designated representative, an air entraining admixture may be added to facilitate placement.

## **505S.4 Construction Methods**

When indicated on the Drawings or acceptable to Engineer or designated representative, concrete encasement shall be placed to protect the pipe. Pipe or bedding shall not be placed where:

- (a) the top of the pipe would have less than 30 inches (750 mm) of cover from finish grade,
- (b) the ground water invades the trench, or
- (c) the trench bottom is of unstable material.

If either of these conditions is encountered, the Engineer or designated representative shall be notified and may direct the Contractor to:

- (a) encase the pipe with concrete,
- (b) change pipe material, or
- (c) use a higher strength class of pipe.

Concrete encasement shall extend from 6 inches (150 mm) below to 6 inches (150 mm) above the outer projections of the pipe over the entire width of the trench in accordance with the City of Austin Standard Detail 501S-1," Encasement Detail w/ Casing Spacers".

The ends of the encasement pipe shall be bulkheaded (Standard Specification Item No. 507S) with concrete blocks, bricks or stones, dry-stacked without mortar, sufficient to prevent the intrusion of trench backfill material into the encasement, but fitted loosely enough to facilitate the escape of water from the encasement should carrier pipe leakage or failure occur.

## 505S. 5 Measurement

Concrete encasement will be measured by the lineal foot (meter: 1 meter equals 3.281 feet), for size of pipe being encased, complete in place. The measurement will be made between ends of the encasement, along the central axis as installed.

Encasement pipe installed by open cut will be measured by size of encasement installed, complete in place. The measurement will be made between the ends of the pipe, along the central axis as installed.

## 505S.6 Payment

Work performed and materials furnished as prescribed by this item will be included in a unit price bid item from Standard Specification Item No. 510, "Pipe" unless included as a separate pay item in the contract.

When included for payment, it shall be measured as provided under "Measurement" and will be paid at the unit bid price per lineal foot for "Concrete Encasement" or "Encasement Pipe" of the size indicated on the Drawings. The unit bid price shall include full compensation for furnishing all materials, pipe for all preparation, hauling, installation and for all labor, tools, equipment and incidentals necessary to complete the work, including bench excavation and disposal of surplus material.

Payment, when included as a contract Pay Item, will be made under one of the following:

Pay Item No. 505S-A: Concrete Encasement for \_\_\_ Dia. Pipe - Per Lineal Foot.

Pay Item No. 505S-B: Encasement Pipe \_\_\_ Dia., Type \_\_\_, - Per Lineal Foot.

#### **End**

**SPECIFIC** Cross Reference Materials

Standard Specification Item No. 505S, "Encasement and Encasement Pipe"

City of Austin Standard Specification Items

<u>Designation</u> <u>Description</u>

Item 403S Concrete For Structures

Item 507S Bulkheads
Item 510 Pipe

Section 510.2(8)(o) Corrugated Metal Pipe (CMP)

City of Austin Standard Details

<u>Designation</u> <u>Description</u>

Detail 501S-1 Encasement Detail w/ Casing Spacers

American Society for Testing and Materials (ASTM)

<u>Designation</u> <u>Description</u>

A-134 Specification for Pipe, Steel, Electric-Fusion (Arc)-Welded

(Sizes NPS 16 and Over)

C-76/C-76M Specification for Reinforced Concrete Culvert, Storm

Drain, and Sewer Pipe

**RELATED** Cross Reference Materials

Standard Specification Item No. 505S, "Encasement and Encasement Pipe"

TxDOT Specifications

Designation Description

Item 421 Portland Cement Concrete

Section 421.9 Quality of Concrete Section 421.2(8) Mortar and Grout

City of Austin Standard Specification Items

<u>Designation</u> <u>Description</u>

Item No. 501S Jacking or Boring Pipe

Item No. 506ManholesSection 510.2(8)(c)Concrete pipeSection 510.2(8)(m)Steel Pipe

Item No. 593S Concrete Retards

Previous Versions: 02/24/10, 03/26/08, 03/09/04, 02/17/00 and 05/16/97

Item No. 509S Excavation Safety Systems

# 509S.1 Description

This item shall govern the designing, furnishing, installing, maintaining and removing or abandoning of temporary Excavation Safety Systems consisting of trench shields, aluminum hydraulic shoring, timber shoring, trench jacks, tieback or braced sheeting, tieback slurry walls, soil nailing, rock bolting, tieback or braced soldier piles and lagging, and other systems for protecting workers in excavations. This item shall also govern the designing and constructing of sloping and benching systems for protecting workers in excavations.

At a minimum, the Excavation Safety Systems shall conform to United States Department of Labor Rules 29 CFR, Occupational Safety and Health Administration, Part 1926 Safety and Health Regulations for Construction, Subpart P, Excavation (hereinafter called OSHA).

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

## 509S.2 Definitions

"Competent Person" shall mean one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The competent person shall be capable of interpreting the manufacturer's data sheets and interpreting and implementing the Excavation Safety System Plan.

An "Excavation" shall mean any cut, cavity, trench, or depression in an earth surface, formed by earth removed by the Contractor. The Contractor shall provide an Excavation Safety System for all excavations except when 1) the excavation is in stable rock as determined by the Texaslicensed Professional Engineer who prepared the Contractor's Excavation Safety System Plan or 2) the excavation is less than 5 feet (1.52 m) in depth and examination of the ground by the Contractor's competent person provides no indication of a potential cave-in.

"Trench" (trench excavation) shall mean any narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth shall be greater than the width, but the width of a trench (measured at the bottom) shall not be greater than 15 feet (4.56 m). Excavation Safety Systems for such trenches shall be defined as "Trench Excavation Safety Protective Systems".

If the Contractor installs or constructs forms or other structures in an excavation such that the dimension measured from the forms or structures to the sides of the excavation is reduced to 15 feet (4.6 m) or less (measured at the bottom of the excavation), those excavations shall also be defined as a Trench if workers must enter it. Excavation Safety Systems for such trenches shall also be defined as "Trench Excavation Safety Protective Systems".

# **509S.3 Excavation Safety System Submittals**

A. The Notice to Proceed with construction may be issued by the Owner before the Contractor has submitted the necessary Excavation Safety Plan(s); however, excavation shall not proceed until the Owner has received the Contractor's Excavation Safety Plan(s) for the Project.

## B. Prior to Starting Excavation

Prior to starting any Excavation, the Contractor shall submit to the Owner:

- 1. A certificate indicating that the Contractor's Competent Person(s) has completed training in an excavation safety program based on OSHA regulations within the past 5 years.
- 2. Manufacturer's tabulated data or other tabulated data for Excavation Safety Systems consisting of pre-engineered protective systems such as trench shields, aluminum hydraulic shoring, timber shoring, pneumatic shoring, or trench jacks, or benching or sloping or other protective systems that are not designed specifically for the Project.

Manufacturer's tabulated data shall meet the requirements in OSHA and shall describe the specific equipment to be used on the Project. Tabulated data must bear the seal of the licensed professional engineer who approved the data. Manufacturer's tabulated data shall be an attachment to the Contractor's Excavation Safety System Plan described below.

# 509S.4 Excavation Safety System Plan

The Contractor shall prepare an Excavation Safety System Plan (hereafter called the <u>"Plan"</u>) specifically for the Project. The Contractor shall retain a Texas-licensed Professional Engineer to prepare the Plan. On City-funded projects, the Contractor must follow qualifications-based procedures to procure the required Professional Engineering services, according to Chapter 2254 of the Texas Government Code.

The Contractor shall be responsible for obtaining geotechnical information necessary for design of the Excavation Safety System. If geotechnical information for design of the Project has been acquired by the Owner or designated representative, it shall be provided to the Contractor for information purposes subject to the provisions of City of Austin Standard Contract Section 00220, "Geotechnical Data."

- A. The Plan for Excavation Safety Systems consisting of pre-engineered protective systems such as trench shields, aluminum hydraulic shoring, timber shoring, pneumatic shoring, or trench jacks, or benching or sloping or other protective systems that are not designed specifically for the Project shall include:
  - 1. Detailed Drawings of the Excavation Safety System(s) that will provide worker protection conforming to OSHA. The Drawings shall note the required load carrying capacity, dimensions, materials, and other physical properties or characteristics in sufficient detail to describe thoroughly and completely the Excavation Safety System(s).
  - 2. Drawings, notes, or tables clearly detailing the specific areas of the Project in which each Excavation Safety System shall be used, the permissible size of the excavation, the length of time that the excavation shall remain open, the means of egress from the excavation, the location of material storage sites in relation to the excavation, the methods for placing/compacting bedding/backfill within the safety of the system, any excavation safety equipment restrictions and subsequent removal of the system.
  - 3. Recommendations and limitations for using the Excavation Safety Systems.
  - 4. A Certificate of Insurance of the Excavation Safety System Engineer's Professional Liability Insurance coverage. For City-funded projects, coverage meeting the requirements of Standard Contact Documents Section 00810 shall be provided. For privately funded projects the coverage shall be at least \$1,000,000.
- B. The Plan for Excavation Safety Systems consisting of tieback or braced sheeting, tieback or braced soldier piles and lagging, slurry walls, soil nailing, rock bolting or other protective systems that are designed specifically for the Project shall include:

- Detailed Drawings of the Excavation Safety System(s) that will provide worker protection conforming to OSHA. The Drawings shall note the design assumptions, design criteria, factors of safety, applicable codes, dimensions, components, types of materials, and other physical properties or characteristics in sufficient detail to describe thoroughly and completely the Excavation Safety System(s).
- 2. Detailed technical specifications for the Excavation Safety System addressing the properties of the materials, construction means and methods, quality control and quality assurance testing, performance monitoring, and monitoring of adjacent features, as appropriate.
- 3. Drawings that clearly detail the specific areas of the Project in which each type of system shall be used and showing the plan and elevation (vertical profile) views.
- 4. Drawings, notes or tables clearly detailing the length of time that the excavation shall remain open, the means of egress from the excavation, the location of material storage sites in relation to the excavation, the methods for placing/compacting bedding/backfill within the safety of the system, any excavation safety equipment restrictions and subsequent removal or abandonment of the system or parts thereof.
- 5. Recommendations and limitations for using the Excavation Safety Systems.
- 6. A Certificate of Insurance of the Excavation Safety System Engineer's Professional Liability Insurance coverage. For City-funded projects, coverage meeting the requirements of Standard Contract Documents Section 00810 shall be provided. For privately funded projects the coverage shall be at least \$1,000,000.

# 509S.5 Excavation Safety System Submittal Review

Review of the Excavation Safety System submittal conducted by the Owner or designated representative shall only relate to conformance with the requirements herein. The Owner's failure to note exceptions to the submittal shall not relieve the Contractor of any or all responsibility or liability for the adequacy of the Excavation Safety System. The Contractor shall remain solely and completely responsible for all Excavation Safety Systems and for the associated means, methods, procedures, and materials.

# 509S.6 Contractor's Responsibility

The Contractor shall be responsible for implementing the Excavation Safety System Plan and for confirming that the Excavation Safety System(s) used on the Project meets the requirements of the Plan.

The Contractor's Competent Person(s) shall be on the Project whenever workers are in an excavation meeting the definitions of a Trench given in 509S.2.

## 509S.7 Construction Methods

The Contractor's Competent Person(s) shall maintain a copy of appropriate OSHA regulations onsite and shall implement OSHA excavation safety regulations at the work site. The Contractor shall perform all excavation in a safe manner and shall maintain the Excavation Safety Systems to prevent death or injury to personnel or damage to structures, utilities or property in or near excavation.

If evidence of possible cave-ins or earthen slides is apparent or an installed Excavation Safety System is damaged, the Contractor shall immediately cease work in the excavation, evacuate

personnel from any potentially hazardous areas and notify the Owner. Personnel shall not be allowed to re-enter the excavation until necessary repairs or replacements are completed and are inspected and approved by the Contractor's Competent Person(s). Repair and replacement of damaged Excavation Safety System shall be at the Contractor's sole expense.

# **509S.8 Changed Conditions**

When changed conditions require modifications to the Excavation Safety System, the Contractor shall provide to the Owner or designated representative a new design or an alternate Excavation Safety System Plan that is proposed by the Contractor's Excavation Safety System Engineer to address the changed conditions. Copies of the new design or alternate system shall be provided to the Owner or designated representative in accordance with the requirements of section 509S.3, "Excavation Safety System Plan Submittals". A copy of the most current Excavation Safety System Plan shall be maintained on site and made available to inspection and enforcement officials at all times.

Any changes to the Excavation Safety System Plan that are initiated by the Contractor for operational efficiency or as a result of changed conditions, that could be reasonably anticipated, will not be cause for contract time extension or cost adjustment. When changes to the Excavation Safety System Plan are necessitated by severe and uncharacteristic natural conditions or other conditions not reasonably within the control of the Contractor, the Contractor may make a written request to the Owner for a Change Order to address the anticipated work. The Contractor shall notify the Owner in writing within 24 hours of the occurrence of changed conditions that the Contractor anticipates the submittal of a claim for additional compensation. Under 'Changed Conditions" the work deemed immediately necessary by the Contractor to protect the safety of workers and public, equipment or materials may only be accomplished until the Owner or designated representative has a reasonable opportunity to investigate the Contractor's written request for a Change Order and respond in writing to the request.

## 509S.9 Measurement

Trench Excavation Safety Protective Systems will only be measured and paid for those trenches that workers would reasonably be expected to enter.

Trench Excavation Safety Protective Systems for Trenches excavated to a final width (measured at the bottom of the excavation) not exceeding 15 feet (4.56 m) shall be measured by the linear foot (meter: 1 meter equals 3.281 feet) through manholes, bore pits, receiving pits, and other appurtenances along the centerline of the trench. This method of measurement shall apply to any and all protective systems, including but not limited to tieback or braced sheeting, tieback or braced soldier piles and lagging, slurry walls, soil nails, rock bolts, shoring, trench boxes, and sloping or benching as used to provide a Trench Excavation Safety Protective System in accordance with the Excavation Safety System Plan.

Trench Excavation Safety Protective Systems for Trenches created by installation or construction of forms or other structures in an excavation whose width is greater than 15 feet (4.56 m) such that the dimension measured from the forms or structures to the sides of the excavation is reduced to 15 feet (4.56 m) or less (measured at the bottom of the excavation) shall be measured by the linear foot along the centerline of the Trench. Where forms or structures create multiple Trenches in one excavation, each Trench shall be measured separately. This method of measurement shall apply to any and all protective systems, including but not limited to tieback or braced sheeting, tieback or braced soldier piles and lagging, slurry walls, soil nails, rock bolts, shoring, trench boxes, and sloping or benching as used to provide a Trench Excavation Safety Protective System in accordance with the Excavation Safety System Plan.

# 509S.10 Payment

Payment for Trench Excavation Safety Protective Systems, measured as prescribed above, will be made at unit bid price per centerline linear foot of Trench. The unit bid price shall include full compensation for designing, furnishing, installing the system; for dewatering, and for maintaining, replacing, repairing and removing the Trench Excavation Safety Protective System and for sloping, special clearing, and excavation necessary to safely implement the Excavation Safety System Plan. No payment will be made for Trench Excavation Safety Protective Systems made necessary by the Contractor's selection of an optional design or sequence of work that creates the need for the Trench Excavation Safety Protective System.

Payment will be made under the following:

Pay Item No. 509S-1: Trench Excavation Safety Protective Systems, (all depths)

Per Linear Foot.

## **END**

# **SPECIFIC** Cross Reference Materials

Standard Specification Item No. 509S, "Excavation Safety Systems"

# City of Austin Standard Contract Documents

DesignationDescriptionSection 00020Invitation for BidsSection 00220Geotechnical DataSection 00650Certificate of InsuranceSection 00700, Article 6.11Safety and Protection

Section 810 Supplemental General Conditions

29 CFR, Occupational Safety and Health Administration, Part 1926 Safety and Health Regulations for Construction, Subpart P, Excavation

Texas Health and Safety Code Title 9 Chapter 756 Subchapter C

Texas Government Code Chapter 2254

# **RELATED** Cross Reference Materials

Standard Specification Item No. 509S, "Excavation Safety Systems"

## Texas Department of Transportation Standard Specifications

For Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u> <u>Description</u>

Item 104 Removing Concrete

Item 110 Excavation

Item 402 Trench Excavation Protection

# City of Austin Standard Specification Items

<u>Designation</u> <u>Description</u>

Item No. 101SPreparing Right of WayItem No. 102SClearing and GrubbingItem No. 110SStreet Excavation

Item No. 111S Excavation Item No. 130S Borrow

# Current Version: September 26, 2012

Previous Versions: 02/24/10, 03/26/08, 03/09/04, 02/17/00 and 05/16/97

	03/09/04, 02/11/00 and 03/10/91
Item No. 132S	Embankment
Item No. 201S	Subgrade Preparation
Item No. 402S	Controlled Low Strength Material
Item No. 501S	Jacking or Boring Pipe
Item No. 503S	Frames, Grates, Rings and Covers
Item No. 504S	Adjusting Structures
Item No. 505S	Concrete Encasement and Encasement Pipe
Item No. 506	Manholes
Item No. 507S	Bulkheads
Item No. 510	Pipe
Item No. 511S	Water Valves
Item No. 593S	Concrete Retards
Item No. 594S	Gabions and Revet Mattresses

## 510.1 - Description

This item governs the furnishing and installing all pipe and/or materials for constructing pipe mains. sewers, laterals, stubs, inlet leads, service connections, culverts, temporary service lines and temporary diversion lines, including all applicable Work such as excavating, bedding, jointing, backfilling materials, tests, concrete trench cap, concrete cap and encasement, etc., prescribed under this item in accordance with the provisions of the Edwards Aquifer Protection Ordinance, when applicable, and City of Austin Utility Criteria Manual, Section 5, "Working in Public Rights-of-Way." The pipe shall be of the sizes, types, class and dimensions indicated or as designated by the E/A and shall include all joints or connections to new or existing mains, pipes, sewers, manholes, inlets, structures, etc., as may be required to complete the Work in accordance with specifications and published standard practices of the trade associations for the material specified and to the lines and grades indicated. This item shall include any pumping, bailing, and drainage when indicated or applicable. Unless otherwise provided, this item shall consist of the removal and disposition of trees, stumps and other obstructions, old structures or portions thereof such as house foundations, old sewers, masonry or concrete walls, the plugging of the ends of abandoned piped utilities cut and left in place and the restoration of existing utilities damaged in the process of excavation, cutting and restoration of pavement and base courses, the furnishing and placing of select bedding, backfilling and cement or lime stabilized backfill, the hauling and disposition of surplus materials, bridging of trenches and other provisions for maintenance of traffic or access as indicated.

## 510.2 - Materials

The Contractor shall submit descriptive information and evidence that the materials and equipment the Contractor proposes for incorporation into the Work are of the kind and quality that satisfies the specified functions and quality. Austin Water Utility Standard Products Lists (SPL) form a part of the Specifications. Contractors may, when appropriate, elect to use products from the SPL; however, submittal to the E/A is still required. Should the Contractor elect to use any materials from these lists, each product shall be completely and clearly identified by its corresponding SPL number when making the product submittal. This will expedite the review process in which the E/A, and, if necessary, the Austin Water Utility Standard Products Committee, decides whether the products meet the Contract requirements and the specific use foreseen by the E/A in the design of this engineered Project. The purpose of the SPL's is to expedite review, by the E/A and, if necessary, the Austin Water Utility Standard Products Committee, of Contractor product submittals. The SPL's shall not be considered as being a pre-approved list of products necessarily meeting the requirements of the Project. Items contained in the SPL cannot be substituted for items shown on the Drawings, or called for in the specifications, or specified in the Bidding Requirements, Contract Forms and Conditions of Contract, unless approved by the E/A in conjunction with the Austin Water Utility Standard Products Committee. The Standard Product List current at the time of plan approval will govern.

#### (1) Concrete

Concrete shall conform to Item No. 403S, "Concrete for Structures".

# (2) Coarse Aggregate

Coarse aggregate shall conform to Item No. 403S, "Concrete for Structures" or one of the following:

## (a) Pipe Bedding Stone

Pipe bedding stone shall be clean gravel, crushed gravel or crushed limestone, free of mud, clay, vegetation or other debris, conforming to ASTM C 33 for stone quality. Size gradation shall conform to ASTM C-33 No. 57 or No. 67 or the following Table:

SIEVE SIZE	% RETAINED BY WEIGHT
1½"	0
1"	0—10
1/2'	40—85
#4	90—100
#8	95—100

# (b) Foundation Rock

Foundation rock shall be well graded coarse aggregate ranging in size from 2 to 8 inches.

# (c) Flexible Base

Flexible base shall conform to Item No. 210S, "Flexible Base".

## (3) Fine Aggregate

# (a) Concrete and Mortar Sand

Fine aggregate shall conform to Item No. 403S, "Concrete for Structures".

# (b) Bedding Sand

Sand for use as pipe bedding shall be clean, granular and homogeneous material composed mainly of mineral matter, free of mud, silt, clay lumps or clods, vegetation or debris. The material removed by decantation TxDOT Test Method Tex-406-A, plus the weight of any clay lumps, shall not exceed 4.5 percent by weight.

The resistivity shall not be less than 3000 ohms-cm as determined by TxDOT Test Method Tex-129-E. Size gradation of sand for bedding shall be as follows:

GRADATION TABLE	
SIEVE SIZE	% RETAINED BY WEIGHT
1/4"	0
#60	75—100
#100	95—100

# (c) Stone Screenings

Stone screenings shall be free of mud, clay, vegetation or other debris, and shall conform to the following Table:

SIEVE SIZE	% PASSING
3/8 "	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10

All screenings shall be the result of a rock crushing operation.

# (4) Controlled Low Strength Material

Controlled Low Strength Material (CLSM) shall conform to Item 402S, "Controlled Low Strength Material.

# (5) Pea Gravel

Pea gravel bedding shall be clean washed material, hard and insoluble in water, free of mud, clay, silt, vegetation or other debris. Stone quality shall meet ASTM C 33. Size gradation shall be as follows:

SIEVE SIZE	% RETAINED BY WEIGHT
3/4"	0
1/2"	0—25
1/4"	90—100

#### (6) Select Backfill or Borrow

This material shall consist of borrow or suitable material excavated from the trench. It shall be free of stones or rocks over 8 inches and shall have a plasticity index of less than 20. The moisture content at the time of compaction shall be within 2 percent of optimum as determined by TxDOT Test Method Tex-114-E. Sandy loam borrow will not be allowed unless shown on the Drawings or authorized by the E/A.

All suitable materials from excavation operations not required for backfilling the trench may be placed in embankments, if applicable. All unsuitable materials that cannot be made suitable shall be considered surplus excavated materials as described in 510.3(13). The Contractor may, if approved by the engineer, modify unsuitable materials to make them suitable for use. Modification may include drying, removal or crushing of over-size material, and lime or cement treatment.

## (7) Cement Stabilized Backfill

When indicated or directed by the E/A, all backfill shall be with cement-stabilized backfill rather than the usual materials. Unless otherwise indicated, cement stabilized backfill material shall consist of a mixture of the dry constituents described for Class J Concrete. The cement and aggregates shall be thoroughly dry mixed with no water added to the mixture except as may be directed by the E/A.

#### (8) Pipe

#### General

Fire line leads and fire hydrant leads shall be ductile iron. Domestic water services shall not be supplied from fire service leads, unless the domestic and fire connections are on separately valved branches with an approved backflow prevention device in the fire service branch. All wastewater force mains shall be constructed of ductile iron pipe Pressure Class 250 minimum for pipe greater than 12-inch size and Pressure Class 350 for pipe 12-inch size and smaller. Wastewater pipe shall be in accordance with Austin Water Utility's Standard Products List SPL WW-534 and shall have a corrosion resistant interior lining acceptable to the Owner.

All water pipe within utility easements on private property shall be Ductile Iron Pipe, Pressure Class 350 minimum for pipe 12-inch size and smaller and Pressure Class 250 minimum for pipe greater than 12-inch size wrapped as indicated. For sizes over 24 inches, Concrete Pressure Pipe, steel cylinder type, conforming to the requirements of AWWA C-301 will be acceptable.

There may be no service connections to Concrete Pressure Pipe installed in utility easements on private property. Approved service clamps or saddles shall be used when tapping ductile iron pipe 12 inch size and smaller. All service tubing (¾ inch thru 2 inches) installed in utility easements on private property shall be 150 psi annealed seamless Type K copper tubing with no sweat or soldered joints.

All reclaimed water mains shall be constructed of ductile iron pipe, Pressure Class 350 minimum for pipe 12-inch size and smaller and pressure class 250 for pipe greater than 12-inch size. For mains 12-inch size and smaller, PVC pipe, conforming to the requirements of AWWA C-900, DR 14 shall be acceptable. Reclaimed water pipe shall be manufactured purple, painted purple, or wrapped in purple polyethylene film wrap.

Manufacturers of concrete pipe and pipe larger than 24-inch diameter shall have a quality control program consisting of one or more of the following: 1) a quality management system certified by the American National Standards Institute (ANSI) or National Sanitation Foundation (NSF) to comply with ISO 9001:2000, 2) a quality management system certified by the QCast

Program following the requirements of the ACPA Plant Certification Manual, 3) a quality management system certified by the National Precast Concrete Association 4) a quality control program approved by the OWNER prior to submittal of bids for the PROJECT, or 5) an independent, third party quality control testing and inspection firm for testing and inspecting pipe produced for the PROJECT and approved by the OWNER prior to submittal of bids for the PROJECT. All such quality control programs shall be paid for by the manufacturer. It is the intent of this requirement that the manufacturer will document all appropriate tests and inspections with sampling and inspection criteria, frequency of testing and inspection, date of testing and inspection and date on which every piece was manufactured. Required testing and inspection, including that by an independent, third party, shall be performed full-time during production of pipe for the PROJECT. When requested by the OWNER, the manufacturer will provide copies of test data and results and inspection reports with the shipment of pipe for the PROJECT. Test data and results and inspection reports shall be traceable to specific pipe lots or pieces. Owner approval of the manufacturer's quality control program will expire after three years, at which time the manufacturer must present a current quality control program for approval in order to retain listing on the applicable SPL. Owner approval of the Concrete Pipe manufacturer's quality control program will expire after three years, at which time the manufacturer must present a current quality control program for approval.

The quality of materials, the process of manufacture and the finished pipe shall be subject to inspection and approval by the E/A at the pipe manufacturing plant and at the project site prior to and during installation. Plant inspections shall be conducted at the discretion of the City Representative. Only manufacturers having a quality control program of the type described above will be considered as approved providers of concrete pipe and pipe products as listed in the Standard Products List (SPL).

All water distribution pipe and fittings shall be listed in the Fire Protection Equipment Directory published by the Underwriter's Laboratories, Inc., or shall be Factory Mutual approved for fire service. All water pipe and related products shall be registered by the National Sanitation Foundation as having been certified to meet NSF/ANSI Standard 61.

- (a) Reserved
- (b) Iron Pipe

Iron pipe shall be ductile iron pipe meeting all requirements of standards as follows:

- -For push-on and mechanical joint pipe: AWWA C-151
- -For flanged pipe: AWWA C-115

Barrels shall have a nominal thickness required by Table 1 of AWWA C-115, which thickness corresponds to Special Class 53 in sizes through 54 inch, and Class 350 in 60 and 64-inch sizes. Flanges shall be ductile iron (gray iron is not acceptable); they shall be as shown in ANSI/AWWA C115/A21.15 and shall conform to dimensions shown in Table 2 and Figure 1 of AWWA C115. These flanges are the same in all respects as flanges shown in ANSI/AWWA C110/A21.10 for fittings and are standard for all flanges used with pipe, valve, and equipment units in the City of Austin water distribution and wastewater force main systems. Flanges shall be fabricated and attached to the pipe barrels by U.S. fabricators using flanges and pipe barrels of U.S. manufacture. If fabrication is to be by other than the pipe barrel manufacturer, a complete product submittal and approval by the Austin Water Utility will be required. Additionally, such fabricator shall furnish certification that each fabricated joint has been satisfactorily tested hydrostatically at a minimum pressure of 300 psi.

-Linings and Coating:

Interior surfaces of all iron potable or reclaimed water pipe shall be cement-mortar lined and seal coated as required by AWWA C104. Interior surfaces of all iron wastewater line and force main pipe shall be coated with a non-corrosive lining material as indicated on Austin Water Utility's Standard Products List SPL WW-534. Pipe exteriors shall be coated as required by the applicable pipe specification. The type and brand of interior lining shall be clearly marked on the outside of the pipe and fittings. Except as authorized by the E/A, only one type and brand of pipe lining shall be used on a given project.

Except as described above for flanged pipe (Thickness Class 53) and where not otherwise indicated, ductile iron pipe shall be minimum Class 250 as defined by ANSI/AWWA C150/A21.50-current; all ductile iron pipe and flanges shall meet the following minimum physical requirements:

#### Grade 60-42-10:

- -Minimum tensile strength: 60,000 psi (414 mPa).
- -Minimum yield strength: 42,000 psi (290 mPa).
- -Minimum elongation: 10 percent.

The flanges for AWWA C115 pipe may be also be made from:

#### Grade 70-50-05:

- -Minimum tensile strength: 70,000 psi (483 mPa).
- -Minimum yield strength: 50,000 psi (345 mPa).
- -Minimum elongation: 5 percent.
- 1. Ductile Iron Fittings:

Fittings shall be push-on, flanged or mechanical joint as indicated or approved and shall meet all requirements of standards as follows:

- -Sizes 4 inch through 24 inch: AWWA C-110 or AWWA C-153
- -Sizes larger than 24 inch: AWWA C-110.
- -Lining and Coating:

Interior surfaces or all iron potable/reclaimed water pipe fittings shall be lined with cement- mortar and seal coated as required by AWWA C104. Interior surfaces of all iron wastewater and force main fittings shall be coated with a non-corrosive lining material acceptable to Owner. Fitting exteriors shall be coated as required by the applicable pipe specification.

# Joint Materials

Gaskets for mechanical joints shall conform to ANSI/AWWA A21.11/C-111.

Joining of slip joint iron pipe shall, without exception, be accomplished with the natural or synthetic rubber gaskets of the manufacturer of that particular pipe being used. A joint lubricant shall be used and applicable recommendations of the manufacturer shall be followed.

Gaskets for flanged joints shall be continuous full face gaskets, of 1/8 inch minimum thickness of natural or synthetic rubber, cloth-reinforced rubber or neoprene material,

preferably of deformed cross section design and shall meet all applicable requirements of ANSI/AWWA A21.11/C-111 for gaskets. They shall be manufactured by, or satisfy all recommendations of, the manufacturer of the pipe/fittings being used and be fabricated for use with Class 125 ANSI B16.1 flanges.

Tee-head bolts, nuts and washers for mechanical joints shall be high strength, low alloy, corrosion resistant steel stock equal to "COR-TEN A" having UNC Class 2 rolled threads or alloyed ductile iron conforming to ASTM A 536; either shall be fabricated in accordance with ANSI/AWWA A21.11/C-111.

Hex head bolts and nuts shall satisfy the chemical and mechanical requirements of ASTM A449 SAE Grade 5 plain, and shall be fabricated in accordance with ASTM B 18.2 with UNC Class 2 rolled threads.

Either Tee-Head or Hex-Head bolts, nuts and washers as required, shall be protected with bonded fluoro-polymer corrosion resistant coating where specifically required by the E/A.

All threaded fasteners shall be marked with a readily visible symbol cast, forged or stamped on each nut and bolt, which will identify the fastener material and grade. The producer and the supplier shall provide adequate literature to facilitate such identification; painted markings are not acceptable.

## 3. Polyethylene Film Wrap

All iron pipe, fittings and accessories shall be wrapped with standard 8 mil (minimum) low density polyethylene film or 4-mil (minimum) cross laminated high-density polyethylene conforming to AWWA C-105, with all edges overlapped and taped securely with duct tape to provide a continuous wrap to prevent contact between the piping and the surrounding backfill. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective wrap before backfilling. Polyethylene film wrap for reclaimed water pipe shall be purple.

## Marking

Each pipe joint and fitting shall be marked as required by the applicable AWWA specification. This includes in all cases: Manufacturer's identification, Country where cast, year of casting, and "DUCTILE" or "DI". Barrels of flanged pipe shall show thickness class; others shall show pressure class. The flanges of pipe sections shall be stamped with the fabricators identification; fittings shall show pressure rating, the nominal diameter of openings and the number of degrees for bends. Painted markings are not acceptable.

## 5. Warning Tape

Warning tape for identifying restrained joint pipe and fittings shall be yellow and shall have black lettering at least 2inches high that reads "Restrained Joint / Junta de Restriccion" at intervals not exceeding 24 inches. The warning tape shall be polypropylene having a minimum thickness of 2 mils, a minimum width of 3 inches, and adhesive backing on the side opposite the lettering.

# (c) Concrete

## General

Pipe shall conform to ASTM C 76 for Circular Pipe. Concrete pipe smaller than 12 inches in diameter shall conform to ASTM C 14, Extra Strength. All pipe shall be machine made or cast by a process which will provide uniform placement of the

concrete in the form and compaction by mechanical devices, which will assure a dense concrete. Concrete shall be mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured. Transit mixed concrete shall not be acceptable for use in precast pipe. The pipe shall be Class III or the class indicated. Storm sewer pipe shall be of the tongue and groove or 0-ring joint design. Wastewater pipe shall be of the 0-ring joint design; it shall be acceptably lined for corrosion protection.

#### 2. Marking

Each joint of pipe shall be marked with the pipe class, the date of manufacture, the manufacturer's name or trade mark, diameter of pipe and orientation, if required.

Pipe marking shall be waterproof and conform to ASTM C 76.

#### 3. Minimum Age for Shipment

Pipe shall be considered ready for shipment when it conforms to the tests specified in ASTM C 76.

### 4. Joint Materials

When installing storm sewers (or storm drains), the Contractor shall have the option of using joints with preformed flexible joint sealants or with rubber gaskets. Preformed flexible joint sealants for storm drain joints shall comply with ASTM C 990, and rubber gaskets for storm drain joints shall comply with ASTM C 1619. Mortar shall not be used to seal pre-fabricated joints. Pipe manufacturer shall be responsible for submitting to the Owner a detailed design of the joint upon request. The pipe manufacturer shall be responsible for submitting to the Owner a complete list of joint sizes showing the minimum size of material to be used with each size joint, along with complete instructions on recommended installation procedures. Quality control testing at the manufacturing plant shall be in accordance with Texas Department of Transportation (TxDOT) Departmental Materials Specifications (DMS) 7310, "Reinforced Concrete Pipe And Machine-Made Precast Concrete Box Culvert Fabrication And Plant Qualification". The pipe manufacturer shall be verified as compliant with TxDOT DMS 7310 at time of pipe delivery to the jobsite.

#### a. Mortar

Mortar for joints shall meet the requirements set forth below in "Mortar".

# b. Cold Applied Preformed Plastic Gaskets

Cold Applied Plastic Gaskets shall be suitable for sealing joints of tongue and groove concrete pipe. The gasket sealing the joint shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler and shall contain no solvents, irritating fumes or obnoxious odors. The gasket joint sealer shall not depend on oxidizing, evaporating or chemical action for its adhesive or cohesive strength and shall be supplied in extruded rope form of suitable cross section. The size of the plastic gasket joint sealer shall be in accordance with the manufacturer's recommendations and sufficient to obtain squeeze-out around the joint. The gasket joint sealer shall be protected by a suitable removable wrapper that may be removed longitudinally without disturbing the joint sealer to facilitate application.

The chemical composition of the gasket joint sealing compound as shipped shall meet the following requirements:

Composition (% by weight)	Test Method	Typical Analysis
Bitumen (petroleum plastic content)	ASTM D 4	50-70
Ash-inert Mineral Water	Tex-526-C	30-50
Volatile Matter (at 325 F)	Tex-506-C	2.0 Maximum

The gasket joint sealing compound when immersed for 30 days at ambient room temperature separately in 5 percent solution of caustic potash, a mixture of 5 percent hydrochloric acid, a 5 percent solution of sulfuric acid and a saturated H2S solution shall show no visible deterioration.

The physical properties of the gasket joint sealing compound as shipped shall meet the following requirements:

Property	Test Method	Typical Analysis		
			Maximum	
Specific Gravity at 77 F	ASTM D 71	1.20	1.35	
Ductility at 77F (cm) Minimum	Tex-503-C	5.0		
Softening point	Tex-505-C	275 F		
Penetration:				
32 F (300 g) 60 sec	Tex-502-C	75		
77 F (150 g) 5 sec	Tex-502-C	50	120	
115 F (150 g) 5 sec	Tex-502-C		150	
Flashpoint C.O.C. F	Tex-504-C	600 F		
Fire Point C.O.C. F	Tex-504-C	625 F		

When constructing wastewater lines, the Contractor shall use 0-ring gasket joints conforming to ASTM C 443. Just before making a joint, the ends of the pipe shall be clean, dry, free of blisters or foreign matter and shall be wire brushed. For Oring joints, the gasket and the inside surface of the bell shall be lubricated with a light film of soft vegetable soap compound to facilitate assembly of the joint. The rubber O-ring gasket shall be stretched uniformly in the joint. Wedge seal type ("Forsheda" pre-lubricated) gaskets may be used if joint details submitted are approved; installation of such gaskets shall be in strict accordance with the manufacturer's recommendations, and shall be the sole element depended upon to make the joint flexible and watertight.

In wastewater lines no horizontal or vertical angles in the alignment of pipes shall be permitted unless indicated. The spigot shall be centered in the bell, the pipe pushed uniformly home and brought into true alignment. Bedding material shall be placed and tamped against pipe to secure the joint.

### 5. Bends

When horizontal or vertical angles in the alignment of storm sewers are indicated, the bend or angle shall be constructed by cutting on a bias one or both pipes as may be required for the alignment indicated. The pipe cut shall be sufficiently long to allow exposing the reinforcement, which shall be bent, welded and incorporated into the pipe bend and reinforced concrete collar to maintain the structural integrity. The collar shall be 6 inches minimum, reinforced with #4 bars on a 1 foot center both directions. Builder's hardware cloth may be used on the outside of the joint to aid in holding cementing materials in place. Plywood, fiberboard or other materials placed on the inside of the pipe as formwork shall be removed as soon as the joint materials have obtained initial set, after which the inside surface of the pipe joint shall be finished smooth and true to the line and grade established. The Contractor may use prefabricated bends meeting the specification requirements in lieu of field fabricated bends. All bends shall be watertight, have a smooth flow line and be equal or greater in strength to the adjacent pipe.

Horizontal or vertical changes in alignment in wastewater lines shall be accomplished by use of manholes. With the E/A's approval, horizontal changes in alignment may be made by the "Joint Deflection" method. Joint deflection is limited by regulations of the Texas Commission on Environmental Quality (TCEQ) to 80 percent of the maximum recommended by the manufacturer; such deflection may not exceed 5 degrees at any joint. Changes in alignment using pipe flexure shall not be allowed.

#### Sulfide and Corrosion Control

All concrete pipe used for wastewater installations shall be protected from sulfide and corrosion damage by using limestone aggregate.

# (d) Concrete Steel Cylinder (CSC) Pipe

### 1. General Requirements

The Contractor shall submit to the E/A for approval along with other required data a tabulated layout schedule with reference to the stationing and grade lines to be used.

The manufacturer shall furnish all fittings and special pieces required for closures, bends, branches, manholes, air valves, blow offs and connections to main line valves and other fittings as indicated.

Each pipe length, fitting and special joint shall have plainly marked on the bell end of the pipe, the head condition for which it is designed. In addition, marking shall be required to indicate the location of each pipe length or special joint in the line and such markings will be referenced to the layout schedules and drawings and submitted for approval.

Concrete steel cylinder fittings shall be tested as required by the applicable AWWA Standards.

# 2. Design and Inspection

Where not otherwise indicated, concrete steel cylinder pipe shall be Class 150, designed to withstand a vacuum of not less than 28 feet of water. Valve reducers, tees and outlets from a pipe run shall be designed and fabricated so that all stresses are carried by the steel forming the fitting or outlet.

Concrete steel cylinder pipe shall meet one of the following specifications:

AWWA C-301 - Any Size

AWWA C-303 - 24-inch maximum size

All pipe flanges shall conform to AWWA C-207, requirements for standard steel flanges of pressure classes corresponding to the pipe class.

Pipe to be installed in a tunnel or encasement shall be manufactured with 1 inch thick by 24-inch wide skid bands of mechanically impacted mortar in addition to the normal coating.

All concrete steel cylinder fittings shall be constructed of steel plate of adequate strength to withstand both internal pressure and external loading. Rod reinforcing shall not be used to figure the required steel area. The fittings shall have a concrete lining and 1 inch minimum coating of cement mortar, except that centrifugally spun lining need not be reinforced.

Minimum lining thickness shall be ½ inch for 16-inch pipe and ¾ inch for sizes larger than 16-inch pipe. Where it is impractical to place such concrete protection on interior surfaces of small outlets, 2 coats of "Bitumastic Tank Solution" shall be applied.

No fitting shall be made by cutting of standard pipe, except that outlets of less than 75 percent of the pipe diameter may be placed in a standard pipe. Beveled spigots may be placed on standard pipe.

# 3. Joint Materials

Joints shall be of the rubber gasket type conforming to the applicable standards. The inside and outside recesses between the bell and spigot shall be completely filled with Cement Grout in accordance with the pipe manufacturer's recommendations. Grout materials for jointing such pipe, unless otherwise indicated, shall be as described herein.

# (e) Reserved

# (f) Polyethylene Tubing

## General

All polyethylene (PE) tubing shall be high density, high molecular weight plastic tubing meeting ASTM D2737; it shall be pressure rated at 200 psi working pressure and

must bear the National Sanitation Foundation seal of approval for potable water service. Pipe manufacturers shall be listed on SPL WW-65.

#### Materials

Polyethylene plastics shall be Designation PE3408 (Grade P34 with hydrostatic design stress of 800 psi).

### 3. Markings

Permanent marking on the tubing shall include the following at intervals of not more than 5 feet:

Nominal tubing size.

Type of plastic material, i.e., PE 3408.

Dimension Ratio (SDR) and pressure rating in psi for water at 73.4 F (e.g., SDR-9, 200 psi).

ASTM D 2737 designation.

Manufacturer's name or trademark, code and seal of approval (NSF mark) of the National Sanitation Foundation.

Polyethylene tubing for reclaimed service lines shall be purple.

#### 4. Tube Size

PE tubing shall be standard copper tube size outside diameter, with Standard Dimension Ratio (SDR) of 9.

## (g) Copper Tubing

All copper service tubing shall be annealed seamless Type K water tube meeting ASTM B88 and rated at 150 psi working pressure. The tubing shall be homogenous throughout and free from cracks, holes, crimping, foreign inclusions or other defects. It shall be uniform in density and other physical properties. Copper tubing for reclaimed water shall be wrapped in purple polyethylene film wrap. Pipe manufacturers shall be listed on SPL WW-613.

# (h) Service Connection Fittings

All fittings used in customer service connection - tapping mains, connecting meters, etc. - must be currently listed on the applicable Water and Wastewater Standard Products List (SPL WW-68), or called for in the City of Austin Standard Details (520 - series).

#### (i) Brass Goods

All brass valves, couplings, bends, connections, nipples and miscellaneous brass pipe fittings and accessories used in meter connections, service lines, air release piping assemblies, and wherever needed in the water distribution system, shall conform to the City of Austin Standards, Austin Water Utility Standard Products Lists, and AWWA C-800, except as herein modified or supplemented.

Unless otherwise noted, the goods described herein shall be fabricated of standard Red Brass (Waterworks Brass) meeting ASTM B62 or B584, alloy 83600, consisting of 85 percent copper and 5 percent each of tin, lead and zinc.

Exposed threads shall be covered with plastic caps or sheeting to protect the threads.

Brass goods of each type and class shall be compatible with other fittings in common usage for similar purposes. Where not otherwise indicated, all such materials shall meet the following requirements:

Inlet threads of corporation valves shall be AWWA iron pipe (IP) thread (male); outlets of service saddles shall be tapped with AWWA IP thread (female). AWWA IP threads shall conform to ANSI/ASME B1.20.1 as required by AWWA C800 for "General Purpose (Inch) Pipe Threads". For 3/4" and 1" sizes only, corporation valve inlet threads, and the internal threads of saddles may be the AWWA taper thread conforming to AWWA C800 Figure 1 and Table 6. External threads of corporation valve inlet must be compatible with internal threads of the service saddle.

Connections of all new tubing, and of tubing repairs wherever possible, shall be by compression fittings. Compression connections shall be designed to provide a seal and to retain the tubing, without slippage, at a working water pressure of 150 psig.

Flanges shall conform to ANSI B16.1, Class 125, as to dimensions, drillings, etc. Copper tubing, when used, shall be Type K tubing having dimensions and weights given in Table A.1 of AWWA C800.

Brass pipe shall conform to the weights and dimensions for Extra Strong pipe given in Table A.2 of AWWA C800.

All fittings shall be suitable for use at hydrostatic working pressures up to 150 psig (hydrostatic testing of installed systems is at 200 psig).

- (j) Reserved
- (k) Polyvinyl Chloride Potable/Reclaimed Water Pipe
  - 1. General

All polyvinyl chloride (PVC) potable/reclaimed water pipe shall be of the rigid (UNPLASTICIZED) type and must bear the National Sanitation Foundation seal of approval for potable water pipe. Each joint of pipe shall consist of single continuous extrusion; bells or other components attached by solvent welding are not acceptable. Pipe shall be pressure rated at 200 psi (SDR-14).

Pipe shall have push-on, rubber gasket joints of the bell and spigot type with thickened integral bells with rubber gasket joints. The wall thickness of each pipe bell and joint coupling must be greater than the standard pipe barrel thickness. Clearance must be provided in every gasket joint for both lateral pipe deflection and for linear expansion and contraction. Concrete thrust blocking shall be placed behind bends and tees. Concrete support cradles or blocking shall be required for support of all fire hydrants, valves and AWWA C110 fittings; such support shall be provided for AWWA C153 fittings when required by the E/A.

# 2. Applicable Specifications

Except as modified or supplemented herein, PVC pipe shall meet the following standards:

AWWA C-900, or SDR 14 for PVC Pressure Pipe, in 4, 6, 8 and 12 inch nominal sizes, having Cast Iron Pipe size outside diameters.

Fittings used with PVC Pressure pipe shall be AWWA C-110 or AWWA C-153 compact ductile iron fittings.

All pipe 4 inches and larger must be approved Underwriter's Laboratories for use in buried water supply and fire protection systems.

### 3. Material Requirements

All pipe and fittings shall be made from clean, virgin, NSF certified, Class 12454B PVC. Clean reworked materials generated from the manufacturers own production may be used within the current limits of the referenced AWWA C-900.

#### Marking

PVC for reclaimed piping shall be purple or wrapped in purple polyethylene film wrap.

Permanent marking on each joint of pipe shall include the following at intervals of not more than 5 feet:

Nominal pipe size and OD base (e.g., 4 CIPS).

Type of plastic material (e.g., PVC 12454B).

Standard Dimension Ratio and the pressure rating in psi for water at 73 F (e.g., SDR 18, 150 psi).

AWWA designation with which the pipe complies (e.g., AWWA C-900).

Manufacturer's name or code and the National Sanitation Foundation (NSF) mark.

### Tracer Tape

Inductive Tracer Detection Tape shall be placed directly above the centerline of all non-metallic pipe a minimum of 12 inches below subgrade or, in areas outside the limits of pavement, a minimum of 18 inches below finished grade. The tracer tape shall be encased in a protective, inert, plastic jacket and color coded according to American Public Works Association Uniform Color Code. Except for minimum depth of cover, the tracer tape shall be placed according to manufacturer's recommendations. Manufacturers must be listed on SPL WW-597.

# (I) Polyvinyl Chloride (PVC) Pipe (Nonpressure) and Fittings

#### 1. General

PVC sewer and wastewater pipe and fittings 6 through 15 inch diameter shall conform to ASTM D 3034. Pipe shall have minimum cell classification of 12364 or 12454. Fittings shall have cell classification of 12454 or 13343. Pipe stiffness shall be at least 115 psi as determined by ASTM D 2412. Pipe manufacturers shall be on SPL WW-227, and fitting manufacturers shall be on SPL WW-227B.

PVC sewer and wastewater pipe and fittings 18 through 27 inch diameter shall conform to ASTM F 679. Pipe shall have minimum cell classification of 12364 or 12454. Pipe stiffness shall be at least 72 psi as determined by ASTM D 2412. Pipe manufacturers shall be on SPL WW-227A, and fitting manufacturers shall be on SPL WW-227B.

#### Joints

PVC pipe and fitting shall have elastomeric gasket joints conforming to ASTM D 3212. Gaskets shall conform to ASTM F 477.

## 3. Pipe Markings

Pipe meeting ASTM D 3034 shall have permanent marking on the pipe that includes the following at intervals of not more than 5 feet:

Manufacturer's name and/or trademark and code.

Nominal pipe size.

PVC cell classification per ASTM D 1784.

The legend "SDR-\_ PVC Sewer Pipe" (SDR 26, 23.5. or less is required)

The designation "ASTM D 3034"

Pipe meeting ASTM F 679 shall have permanent marking that includes the following at intervals of not more than 5 feet:

Manufacturer's name or trademark and code

Nominal pipe size

PVC cell classification per ASTM D 1784

Pipe stiffness designation "PS" PVC Sewer Pipe" (PS of at least 72 is required

The designation "ASTM F 679"

### 4. Fitting Markings

Fittings meeting ASTM D 3034 shall have permanent marking that includes the following:

Manufacturer's name or trademark

Nominal size

The material designation "PVC"

The designation, "ASTM F 679"

Fittings meeting ASTM F 679 shall have permanent marking that includes the following:

Manufacturer's name or trademark and code

Nominal size

The material designation "PVC"

The designation "ASTM F 679"

## Tracer Tape

Inductive Tracer Detection Tape shall be placed directly above the centerline of all non-metallic pipe a minimum of 12 inches below subgrade or, in areas outside the limits of pavement, a minimum of 18 inches below finished grade. The tracer tape shall be encased in a protective, inert, plastic jacket and color coded according to American Public Works Association Uniform Color Code. Except for minimum depth of cover, the tracer tape shall be placed according to manufacturer's recommendations. Manufacturers must be listed on SPL WW-597.

# (m) Steel Pipe

# 1. Standard Weight

ASTM A 53, Schedule 40.

### 2. Extra Heavy Weight

Seamless ASTM A 53, Schedule 80.

#### 3. Encasement Pipe

- a. For direct-bury installations, pipe shall conform to ASTM A134 with minimum thickness of 3/8 inch (9.5 mm).
- b. For jacked installations, pipe shall conform to requirements on drawings.

### 4. Fittings

Nipples and fittings extra strong Federal Specification WW-N 351 or WW-P 521.

### Coatings

Black or galvanized as indicated.

# (n) Welded Steel Pipe and Fittings for Water-Pipe

General Reference Standards Specification.

Specifications of the American Water Works Association (AWWA) listed below shall apply to this Section.

C-200 Steel Water Pipe 6 inches and larger.

C-205 Cement-Mortar Protective Lining and Coating for Steel Water Pipe, 4 inches and larger, Shop Applied.

C-206 Field Welding of Steel Water Pipe.

C-207 Steel Pipe Flanges for Waterworks Services, Sizes 4 inches through 144 inches.

C-208 Dimensions for Steel Water Pipe Fittings.

C-602 Cement-Mortar Lining of Water Pipelines, 4 inches and larger in Place.

### 2. Submittals

Furnish Shop Drawings, product data, design calculations and test reports as described below:

- Certified copies of mill tests confirming the type of materials used in steel plates, mill pipe flanges and bolts and nuts to show compliance with the requirements of the applicable standards.
- b. Complete and dimensional working drawings of all pipe layouts. Shop Drawings shall include the grade of material, size, wall thickness of the pipe and fittings, type and location of fittings and the type and limits of the lining and coating systems of the pipe and fittings.
- Product data to show compliance of all couplings, supports, fittings, coatings and related items.

### 3. Job Conditions

- a. The internal design pressure of all steel pipe and fittings shall be as indicated.
- The interior of all steel pipe for potable water, 4 inches and larger, shall be cement-mortar lined.

### 4. Manufacturing

#### Description

Pipe shall comply with AWWA C-200.

 Circumferential deflection of all pipe in-place shall not exceed 2.0 percent of pipe diameter.

### (2) Diameter

Nominal pipe diameter shall be the inside diameter of lining or pipe barrel, unless otherwise designated in Job Conditions.

#### b. Wall Thickness

(1) Steel pipe wall thickness shall be designed for the internal and external loads specified in this section. The cylinder thickness needed to resist internal pressure shall be based on an allowable stress in the steel equal to ½ the minimum yield stress of the material used.

# 5. Fittings

### a. Welded

Fabricated steel fittings shall be of the same material as pipe and shall comply with AWWA C-208.

### Flanges

- a. Flanges shall comply with the requirements of AWWA C-207, Class D or Class E. The class shall be based on operating conditions and mating flanges of valves and equipment.
- b. Gaskets shall be cloth-inserted rubber, 1/8 inch thick.
- c. Flanges shall be flat faced with a serrated finish.

## Pipe Joints

- a. Lap Joints for Field Welding
  - (1) Lap joints for field welding shall conform to AWWA C-206. This item applies only to pipes 72 inches in diameter and larger.
  - (2) The bell ends shall be formed by pressing on a hydraulic expander or a plug die. After forming, the minimum radius of curvature of the bell end at any point shall not be less than 15 times the thickness of the steel shell. Bell ends shall be formed in a manner to avoid impairment of the physical properties of the steel shell. Joints shall permit a lap at least 1 ½ inches when assembled. The longitudinal or spiral weld on the inside of the bell end and the outside of the spigot end on each section of pipe shall be ground flush with the plate surface. The inside edge of the bell and the outside edge of the spigot shall be scarfed or lightly ground to remove the sharp edges or burrs.

# b. Bell and Spigot Joints with O-Ring Gasket

(1) Bell and spigot joints with rubber gasket shall conform to AWWA C-200.

(2) The bell and spigot ends shall be so designed that when the joint is assembled, it will be self-centered and the gasket will be confined to an annular space in such manner that movement of the pipe or hydrostatic pressure cannot displace it. Compression of the gasket when the joint is completed shall not be dependent upon water pressure in the pipe and shall be adequate to ensure a watertight seal when subjected to the specified conditions of service. Bell and spigot ends shall be welded on preformed shapes. The bell and spigot ends shall conform to the reviewed Shop Drawings.

### 8. Interior and Exterior Protective Surface Coatings

- a. Exterior Surface to be mortar coated shall conform to AWWA C-205 for shop application and AWWA C-602 for field application. Pipe materials shall be the product of an organization, which has had not less than 5 years successful experience manufacturing pipe materials, and the design and manufacture of the pipe, including all materials, shall be the product of one company.
- All surfaces except as noted in c and d below shall receive shop application of mortar lining and coating.
- c. Field Welded Joints. After installation, clean, line and coat unlined or uncoated ends adjacent to welded field joints, including the weld proper, as specified for pipe adjacent to the weld. Potable water only shall be used in the preparation of any cement, mortar, or grout lining.
- d. Machined Surfaces. Shop coat machined surfaces with a rust preventative compound. After jointing surfaces, remaining exposed surfaces shall be coated per a) and b) above.

# (o) Corrugated Metal Pipe

# General

Pipe shall be corrugated continuous lock or welded seam helically corrugated pipe. Corrugated metal pipe may be galvanized steel, aluminized steel or aluminum conforming to the following:

Galvanized Steel AASHTO M 218

Aluminized Steel AASHTO M 274

Aluminum AASHTO M 197

Where reference is made herein to gage of metal, the reference is to U.S. Standard Gage for uncoated sheets. Tables in AASHTO M 218 and AASHTO M 274 list thickness for coated sheets in inches. The Tables in AASHTO M 197 list thickness in inches for clad aluminum sheets.

Sampling and testing of metal sheets and coils used for corrugated metal pipe shall be in accordance with TXDOT Test Method Tex-708-I.

Damaged spelter coating shall be repaired by thoroughly wire brushing the damaged area and removing all loose, cracked or weld-burned spelter coating. The cleaned area shall be painted with a zinc dust-zinc oxide paint conforming to Federal Specifications TT-P 641b. Damaged pipe shall be rejected and removed from the project.

Damaged aluminized coating shall be repaired in accordance with the manufacturer's recommendations.

The following information shall be clearly marked on each section of pipe:

Thickness and corrugations

Trade Mark of the manufacturer

Specification compliance

#### 2. Fabrication

## a. Steel Pipe

Galvanized or aluminized steel pipe shall be full circle or arch pipe conforming to AASHTO M 36, Type I or Type II as indicated.

It may be fabricated with circumferential corrugations; lap joint construction with riveted or spot welded seams or it may be fabricated with helical corrugations with continuous helical lock seam or ultra high frequency resistance butt-welded seams.

#### b. Aluminum Pipe

Pipe shall conform to AASHTO M 196, Type I, circular pipe or Type II, pipe arch as indicated. It may be fabricated with circumferential corrugations; lap joint construction with riveted or spot welded seams or it may be fabricated with helical corrugations with a continuous helical lock seam.

Portions of aluminum pipe that are to be in contact with high chloride concrete or metal other than aluminum, shall be insulated from these materials by a coating of bituminous material. The coating applied to the pipe or pipe arch to provide insulation between the aluminum and other material shall extend a minimum distance of 1 foot beyond the area of contact.

# 3. Selection of Gages

The pipe diameter, permissible corrugations and required gauges for circular pipe shall be as indicated on the drawings.

For pipe arch, the span, rise, gage, corrugation size and coating thickness shall be as shown on the drawings. A tolerance of plus or minus 1 inch or 2 percent of equivalent circular diameter, whichever is greater, will be permissible in span and rise, with all dimensions measured from the inside crests of the corrugations.

#### Joint Material

Except as otherwise indicated, coupling bands and other hardware for galvanized or aluminized steel pipe shall conform to AASHTO M 36 for steel pipe and AASHTO M 196 for aluminum pipe. Field joints for each type of corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of soil material during the life of the installation.

Coupling bands shall be not more than 3 nominal sheet thickness lighter than the thickness of the pipe to be connected and in no case lighter than 0.052 inch for steel or 0.048 inch for aluminum.

Coupling bands shall be made of the same base metal and coating (metallic or otherwise) as the pipe.

Coupling bands shall lap equally on each of the pipes being connected to form a tightly closed joint after installation.

Pipes furnished with circumferential corrugations shall be field jointed with corrugated locking bands. This includes pipe with helical corrugations, which has reformed circumferential corrugations on the ends. The locking bands shall securely fit into at least one full circumferential corrugation on each of the pipe ends being coupled. The minimum width of the corrugated locking bands shall be as shown below for the corrugation which corresponds to the end circumferential corrugations on the pipes being joined:

10½ inches wide for 2 2/3 inches x ½-inch corrugations.

12 inches wide for 3 inches x 1 inch or 5 inches x 1-inch corrugations.

Helical pipe without circumferential end corrugations will be permitted only when it is necessary to join a new pipe to an existing pipe, which was installed with no circumferential end corrugations. In this event pipe furnished with helical corrugations at the ends shall be field jointed with either helically corrugated bands or with bands with projections or dimples. The minimum width of helically corrugated bands shall conform to the following:

12 inches wide for pipe diameters up to and including 72 inches.

14 inches wide for 1 inch deep helical end corrugations.

Bands with projections shall have circumferential rows of projections with one projection for each corrugation. The width of bands with projections shall be not less than the following:

12 inches wide for pipe diameters up to and including 72 inches.

The bands shall have 2 circumferential rows of projections.

161/4 inches wide for pipe diameters of 78 inches and greater.

The bands shall have 4 circumferential rows of projections.

Unless otherwise indicated, all bolts for coupling bands shall be ½-inch diameter. Bands 12 inches wide or less shall have a minimum of 2 bolts and bands greater than 12 inches wide shall have a minimum of 3 bolts.

Galvanized bolts may be hot dip galvanized conforming to AASHTO M 232, mechanically galvanized to provide the same requirements as AASHTO M 232 or electro-galvanized per ASTM A 164 Type RS.

# 5. Additional Coatings or Linings

#### a. Bituminous Coated

Bituminous Coated pipe or pipe arch shall be as indicated both as to base metal and fabrication and in addition shall be coated inside and out with a bituminous coating which shall meet the performance requirements set forth herein. The bituminous coating shall be 99.5 percent soluble in carbon bisulphide. The pipe shall be uniformly coated inside and out to a minimum thickness of 0.05 inch, measured on the crests of the corrugations.

The bituminous coating shall adhere to the metal tenaciously, shall not chip off in handling and shall protect the pipe from deterioration as evidenced by samples prepared from the coating material successfully meeting the Shock Test and Flow Test in accordance with Test Method Tex-522-C.

### b. Paved Invert

Where a Paved Invert is indicated, the pipe or pipe arch, in addition to the fully coated treatment described above, shall receive additional bituminous material of the same specification as above, applied to the bottom quarter of the circumference to form a smooth pavement with a minimum thickness of 1/8 inch above the crests of the corrugations.

## c. Cement Lined

### (1) General

Except as modified herein, pipe shall conform to AASHTO M 36 for lock seam or welded helically corrugated steel pipe. Pipe shall be of full circle and shall be fabricated with two annular corrugations for purposes of joining pipes together with band couplers. Lock seams shall develop the seam strength as required in Table 3 of AASHTO M 36. Concrete lining shall conform to the following:

#### Composition

Concrete for the lining shall be composed of cement, fine aggregate and water that are well mixed and of such consistency as to produce a dense, homogeneous, non-segregated lining.

#### Cement

Portland Cement shall conform to AASHTO M 85.

# Aggregate

Aggregates shall conform to AASHTO M 6 except that the requirements for gradation and uniformity of gradation shall not apply.

#### Mixture

The aggregates shall be sized, graded, proportioned and thoroughly mixed with such proportions of cement and water as will produce a homogenous concrete mixture of such quality that the pipe will conform to the design requirements indicated. In no case, however, shall the proportions of Portland Cement, blended cement or Portland Cement plus pozzolanic admixture be less than 470 lb/cu. yd of concrete.

#### **Thickness**

The lining shall have a minimum thickness of 1/8 inch above the crest of the corrugations.

# Lining Procedures

The lining shall be plant applied by a machine traveling through a stationary pipe. The rate of travel of the machine and the rate of concrete placement shall be mechanically regulated so as to produce a homogenous nonsegregated lining throughout.

#### Surface Finish

The lining machine shall also mechanically trowel the concrete lining as the unit moves through the pipe.

### Certification

Furnish manufacturer's standard certification of compliance upon request of the purchaser.

#### Joints

Pipe shall be joined together with coupling bands made from steel sheets to an indicated thickness of 0.064 inch (12 ga.). Coupling bands shall be formed with two corrugations that are spaced to provide seating in the third corrugation of each pipe end without creating more than ½ inch ± annular space between pipe ends when joined together.

Bands shall be drawn together by two ½ inch galvanized bolts through the use of a bar and strap suitably welded to the band.

When O-ring gaskets are indicated they shall be placed in the first corrugation of each pipe and shall be compressed by tightening the coupling band. Rubber O-ring gaskets shall conform to Section 5.9, ASTM C 361.

# (2) Causes for Rejection

Pipe shall be subject to rejection on account of failure to conform to any of the indications. Individual sections of pipe may be rejected because of any of the following:

Damaged ends, where such damage would prevent making satisfactory joint.

Defects that indicate poor quality of work and could not be easily repaired in the field.

Severe dents or bends in the metal itself.

If concrete lining is broken out, pipe may be rejected or at the discretion of the E/A, repaired in the field in accordance with the manufacturer's recommendation.

Hairline cracks or contraction cracks in the concrete lining are to be expected and does not constitute cause for rejection.

### d. Fiber Bonded

Where fiber bonded pipe is indicated, the pipe or pipe arch shall be formed from sheets whose base metal shall be as indicated. In addition, the sheets shall have been coated with a layer of fibers, applied in sheet form by pressing them into a molten metallic bonding. If a paved invert is indicated it shall be in accordance with the procedure outlined above. The test for spelter coating above is waived for fiber bonded pipe.

### 6. Slotted Drain Storm Sewers

The pipes for the slotted drain and slotted drain outfall shall be helically corrugated, lock seam or welded seam pipe. Materials and fabrication shall be in accordance with the above. The metal thickness shall be a minimum 16 gage.

The chimney assemblies shall be constructed of 3/16 inch welded plate or machine formed 14 gage galvanized steel sheets. The height of the chimney required shall be

as indicated. Metal for the welded plate slot shall meet the requirements of ASTM A 36 and the completed plate slot shall be galvanized after fabrication in accordance with ASTM A 123.

Weld areas and the heat affected zones where the slot is welded to the corrugated pipe shall be thoroughly cleaned and painted with a good quality asphalt base aluminum paint.

#### 7. Mortar

Mortar shall be composed of 1 part Type I Portland Cement and 2 parts clean, sharp mortar sand suitably graded for the purpose and conforming in other respects to the provisions for fine aggregate of Item No. 403, "Concrete for Structures". Hydrated lime or lime putty may be added to the mix, but in no case shall it exceed 10 percent by weight of the total dry mix.

# (9) Geotextile Filter Fabric for Pipe Bedding Material

Geotextile filter fabric for pipe bedding material shall be Hanes Geo Components - TerraTex NO4.5 (AOS US Standard Sieve 70) geotextile fabric or approved equal.

#### 510.3 - Construction Methods

### (1) General

Prior to commencing this Work, all erosion control and tree protection measures required shall be in place and all utilities located and protected as set forth in "General Conditions". Clearing the site shall conform to Item No. 102S, "Clearing and Grubbing". Maintenance of environmental quality protection shall comply with all requirements of "General Conditions" and Item No. 601S, "Salvaging and Placing Topsoil".

The Contractor shall Work such that a reasonable minimum of disturbance to existing utilities will result. Particular care shall be exercised to avoid the cutting or breakage of all existing utilities. If at any time the Contractor's operations damage the utilities in place, the Contractor shall immediately notify the owner of the utility to make the necessary repairs. When active wastewater sewer lines are cut in the trenching operations, temporary flumes shall be provided across the trench while open and the lines shall be restored when the backfilling has progressed to the original bedding lines of the sewer so cut.

The Contractor shall inform utility owners sufficiently in advance of the Contractor's operations to enable such utility owners to reroute, provide temporary detours or to make other adjustments to utility lines in order that the Contractor may Work with a minimum of delay and expense. The Contractor shall cooperate with all utility owners concerned in effecting any utility adjustments necessary and shall not hold the City liable for any expense due to delay or additional Work because of conflicts arising from existing utilities.

The Contractor shall do all trenching in accordance with the provisions and the directions of the E/A as to the amount of trench left unfilled at any time. All excavation and backfilling shall be accomplished as indicated and in compliance with State Statutes.

Where excavation for a pipe line is required in an existing City street, a street cut permit is required and control of traffic shall be as indicated in accordance with the Texas Manual on Uniform Traffic Control Devices.

Wherever existing utility branch connections, sewers, drains, conduits, ducts, pipes or structures present obstructions to the grade and alignment of the pipe, they shall be permanently supported, removed, relocated or reconstructed by the Contractor through cooperation with the owner of the utility, structure or obstruction involved. In those instances

where their relocation or reconstruction is impractical, a deviation from line and grade will be ordered by the E/A and the change shall be made in the manner directed.

Adequate temporary support, protection and maintenance of all underground and surface utility structures, drains, sewers and other obstructions encountered in the progress of the Work shall be furnished by, and at the expense of, the Contractor and as approved by the E/A.

Where traffic must cross open trenches, the Contractor shall provide suitable bridges in conformance with Standard 804S-4. Adequate provisions shall be made for the flow of sewers; drains and watercourses encountered during construction and any structures, which may have been disturbed, shall be satisfactorily restored upon completion of Work.

When rainfall or runoff is occurring or is forecast by the U.S. Weather Service, the Contractor shall not perform or attempt any excavation or other earth moving Work in or near the flood plain of any stream or watercourse or on slopes subject to erosion or runoff, unless given specific approval by the E/A. When such conditions delay the Work, an extension of time for working day contracts will be allowed in accordance with "General Conditions".

### (2) Water Line/New Wastewater Line Separation

Separation between water, reclaimed water, and wastewater lines shall be provided as shown in the Drawings.

Crossings of water, reclaimed water, and wastewater lines shall conform to details in the Drawings.

Wastewater manholes within 9 feet of water and reclaimed water lines shall be made watertight according to details in the Drawings.

## (3) Utility and Storm Sewer Crossings

When the Contractor installs a pipe that crosses under a utility or storm sewer structure and the top of the pipe is within 18 inches of the bottom of the structure, the pipe shall be backfilled as shown in the Drawings. When the Contractor installs a pipe that crosses under a utility or storm sewer structure that is not shown in the Drawings, the pipe shall be backfilled as directed by the Engineer. Payment for backfilling pipe at utility or storm sewer structures not shown in the Drawings shall be by Change Order.

#### (4) Trench Excavation

Excavation in a paved street shall be preceded by saw cutting completely through any asphaltic cement concrete or Portland cement concrete surface, base, or subbase to the underlying subgrade. This requirement shall not apply to excavations made with trenching machines that use a rotating continuous belt or chain for cutting and removing of material.

Underground piped utilities shall be constructed in an open cut in accordance with Federal regulations, applicable State Statutes conforming to Item No. 509S, "Excavation Safety Systems" and with a trench width and depth described below. When pipe is to be constructed in fill above the natural ground, Contractor shall construct embankment to an elevation not less than one foot above the top of the pipe, after which trench is excavated. Required vertical sides shall be sheeted and braced as indicated to maintain the sides of the required vertical excavation throughout the construction period. Adequacy of the design of sheeting and bracing shall be the responsibility of the Contractor's design professional. The Contractor shall be responsible for installation as indicated. After the pipe has been laid and the backfill placed and compacted to 12 inches above the top of the pipe, any sheeting, shoring and bracing required may be removed with special care to insure that the pipe is not disturbed. As each piece of sheeting is removed, the space left by its removal must be thoroughly filled and compacted with suitable material and provisions made to prevent the sides of the trench from caving until the

backfill has been completed. Any sheeting left in place will not be paid for and shall be included in the unit price bid for pipe.

### (5) Trench Width

Trenches for water, reclaimed, and wastewater lines shall have a clear width on each side beyond the outside surfaces of the pipe bell or coupling of not less than 6 inches nor more than 12 inches.

Trenches for Storm Sewers up to 42 inches shall have a width of 1 foot on each side beyond the outside surfaces of the pipe. Pipes more than 42 inches shall have a trench width not to exceed 18 inches on each side beyond the outside surfaces of the pipe.

If the trench width within the pipe zone exceeds this maximum, the entire pipe zone shall be refilled with approved backfill material, thoroughly compacted to a minimum of 95 percent of maximum density as determined by TxDOT Test Method Tex-114-E and then re-excavated to the proper grade and dimensions. Excavation along curves and bends shall be so oriented that the trench and pipe are approximately centered on the centerline of the curve, using short lengths of pipe and/or bend fittings if necessary.

For all utilities to be constructed in fill above natural ground, the embankment shall first be constructed to an elevation not less than 1 foot above the top of the utility after which excavation for the utility shall be made.

# (6) Trench Depth and Depth of Cover

All pipe and in-line appurtenances shall be laid to the grades indicated. The depth of cover shall be measured from the established finish grade, natural ground surface, subgrade for staged construction, street or other permanent surface to the top or uppermost projection of the pipe.

- (a) Where not otherwise indicated, all potable/reclaimed water piping shall be laid to the following minimum depths:
  - 1. Potable/reclaimed water piping installed in undisturbed ground in easements of undeveloped areas, which are not within existing or planned streets, roads or other traffic areas shall be laid with at least 36 inches of cover.
  - 2. Potable/reclaimed water piping installed in existing streets, roads or other traffic areas shall be laid with at least 48 inches of cover below finish grade.
  - 3. Unless approved by the E/A, installation of potable/reclaimed water piping in proposed new streets will not be permitted until paving and drainage plans have been approved and the roadway traffic areas excavated to the specified or standard paving subgrade, with all parkways and sidewalk areas graded according to any applicable provisions of the drainage plans or sloped upward from the curb line to the right-of-way line at a minimum slope of ¼ inch per foot. Piping and appurtenances installed in such proposed streets shall be laid with at least 36 inches of cover below the actual subgrade.
- (b) Where not otherwise indicated, all wastewater piping shall be laid to the following minimum depths:
  - Wastewater piping installed in natural ground in easements or other undeveloped areas, which are not within existing or planned streets, roads or other traffic areas shall be laid with at least 42 inches of cover.
  - 2. Wastewater piping installed in existing streets, roads or other traffic areas shall be laid with at least 66 inches of cover.
  - 3. Wastewater piping installed in such proposed streets shall be laid with at least 48 inches of cover below the actual subgrade.

### (7) Classification of Excavation

Excavation will not be considered or paid for as a separate item of Work, so excavated material will not be classified as to type or measured as to quantity. Full payment for all excavation required for the construction shall be included in the various unit or lump sum Contract prices for the various items of Work installed, complete in place. No extra compensation, special treatment or other consideration will be allowed due to rock, pavement, caving, sheeting and bracing, falling or rising water, working under and in the proximity of trees or any other handicaps to excavation.

# (8) Dewatering Excavation

Underground piped utilities shall not be constructed or the pipe laid in the presence of water. All water shall be removed from the excavation prior to the pipe placing operation to insure a dry firm granular bed on which to place the underground piped utilities and shall be maintained in such unwatered condition until all concrete and mortar is set. Removal of water may be accomplished by bailing, pumping or by a well-point installation as conditions warrant.

In the event that the excavation cannot be dewatered to the point where the pipe bedding is free of mud, a seal shall be used in the bottom of the excavation. Such seal shall consist of Class B concrete, conforming to Item No. 403, "Concrete for Structures", with a minimum depth of 3 inches.

### (9) Trench Conditions

Before attempting to lay pipe, all water, slush, debris, loose material, etc., encountered in the trench must be pumped or bailed out and the trench must be kept clean and dry while the pipe is laid and backfilled. Where needed, sump pits shall be dug adjoining the trench and pumped as necessary to keep the excavation dewatered.

Backfilling shall closely follow pipe laying so that no pipe is left exposed and unattended after initial assembly. All open ends, outlets or other openings in the pipe shall be protected from damage and shall be properly plugged and blocked watertight to prevent the entrance of trench water, dirt, etc. The interior of the pipeline shall at all times be kept clean, dry and unobstructed.

Where the soil encountered at established footing grade is a quicksand, saturated or unstable material, the following procedure shall be used unless other methods are indicated:

All unstable soils shall be removed to a depth of a minimum 2 feet below bottom of piped utility or as required to stabilize the trench foundation. Such excavation shall be carried out for the entire trench width.

All unstable soil so removed shall be replaced with a concrete seal, foundation rock or coarse aggregate materials placed across the entire trench width in uniform layers not to exceed 6 inches, loose measure and compacted by mechanical tamping or other means which shall provide a stable foundation for the utility.

Forms, sheathing and bracing, pumping, additional excavation and backfill required in unstable trench conditions shall be included in the unit price bid for pipe.

#### (10) Blasting

All blasting shall conform to the provisions of the "General Conditions" and/or "Public Safety and Convenience".

# (11) Removing Old Structures

When out of service masonry structures or foundations are encountered in the excavation, such obstructions shall be removed for the full width of the trench and to a depth of 1 foot below the bottom of the trench. When abandoned inlets or manholes are encountered and no plan

provision is made for adjustment or connection to the new sewers, such manholes and inlets within the construction limits shall be removed completely to a depth 1 foot below the bottom of the trench. In each instance, the bottom of the trench shall be restored to grade by backfilling and compacting by the methods provided above. Where the trench cuts through storm or wastewater sewers which are known to be abandoned, these sewers shall be cut flush with the sides of the trench and blocked with a concrete plug in a manner satisfactory to the E/A. When old structures are encountered, which are not visible from the existing surface and are still in service, they shall be protected and adjusted as required to the finished grade.

#### (12) Lines and Grades

Grades, lines and levels shall conform to the General Conditions and/or "Grades, Lines and Levels". Any damage to the above by the Contractor shall be re-established at the Contractor's expense. The Contractor shall furnish copies of all field notes and "cut sheets" to the City.

The location of the lines and grades indicated may be changed only by direction of the E/A. It is understood that the Contractor will be paid for Work actually performed on the basis of the unit Contract prices and that the Contractor shall make no claim for damages or loss of anticipated profits due to the change of location or grade.

All necessary batter boards or electronic devices for controlling the Work shall be furnished by, and at the expense of, the Contactor. Batter boards shall be of adequate size material and shall be supported substantially. The boards and all location stakes must be protected from possible damage or change of location. The Contractor shall furnish good, sound twilled lines for use in achieving lines and grades and the necessary plummets and graduated poles.

The Contractor shall submit to the E/A at least 6 copies of any layout Drawings from the pipe manufacturer for review and approval. The Contractor shall submit the layout Drawings at least 30 days in advance of any actual construction of the project. The E/A will forward all comments of the review to the Contractor for revision. Revisions shall be made and forwarded to the E/A for his acceptance. Prior to commencement of the Project, reviewed layout Drawings will be sent to the Contractor marked for construction.

Should the Contractor's procedures not produce a finished pipe placed to grade and alignment, the pipe shall be removed and relayed and the Contractors procedures modified to the satisfaction of the E/A. No additional compensation shall be paid for the removal and relaying of pipe required above.

# (13) Surplus Excavated Materials

Excess material or material which cannot be made suitable for use in embankments will be declared surplus by the E/A and shall become the property of the Contractor to dispose of off site at a permitted fill site, without liability to the City or any individual. Such surplus material shall be removed from the Work site promptly following the completion of the portion of the utility involved.

#### (14) Pipe Bedding Envelope

Pipe shall be installed in a continuous bedding envelope of the type shown on the drawings or as described herein. The envelope shall extend the full trench width, to a depth of at least 6 inches (150 mm) below the pipe and to a depth of the springline of storm water pipe and at least 12 inches (300 mm) above water, reclaimed, and wastewater pipe.

### (a) Standard Bedding Materials

USE/PIPE	Cement	Natural or	Pea	PIPE BEDDING STONE
		110.00.10.10.1		

MATERIAL	Stabilized Backfill	Mf'd Sand	Gravel	Uncrushed Gravel	Crushed Gravel	Crushed Stone	Stone Screenings	
	WATER and RECLAIMED WATER							
Welded Steel	Х					Х		
Service Tubing 3/4" to 21/2"		Х	Х				Х	
	W	ATER and RE	CLAIMED	WATER (Duct	ile Iron)	ı		
Up to 15 Inch		х	х	Х			Х	
Larger Than 15 Inch ID			Х	Х				
	WATER and	d RECLAIMED	WATER	(PVC only) and	d WASTEW <i>A</i>	ATER	1	
Up to 15 Inch		Х	Х	Х	Х	х	Х	
Larger Than 15 Inch ID			Х	X	х	x		
STORMWATER								
Concrete		Х	Х	Х	X	Х	Х	
Metal		Х	Х	X		I	X	

- (b) General requirements and limitations governing bedding selection.
  - (1) Crushed gravel or crushed stone shall not be used with polyethylene tubing or polyethylene film wrap.
  - (2) Uncrushed gravel may be used with polyethylene film wrap in trenches up to 6 feet deep and in deeper trenches where ample trench width, a tremmie, or conditions will allow controlled placement of the gravel without damaging the polyethylene wrap.

- (3) Bedding shall be placed in lifts not exceeding 8 inches loose thickness and compacted thoroughly to provide uniform support for the pipe barrel and to fill all voids around the pipe.
- (4) Pea Gravel or bedding stone shall be used in blasted trenches.
- (c) Requirements to prevent particle migration.

Bedding material shall be compatible with the materials in the trench bottom, walls and backfill so that particle migration from, into or through the bedding is minimized. The E/A may require one or more of the following measures to minimize particle migration: use of impervious cut-off collars; selected bedding materials, such as pea gravel or bedding stone mixed with sand; filter fabric envelopment of the bedding; cement stabilized backfill; or other approved materials or methods. Measures to minimize particle migration will be shown on the Drawings or designated by the E/A, and, unless provisions for payment are provided in the contract documents, the cost of these measures shall be agreed by change order. The following limitations shall apply.

- (1) Sand, alone, shall not be used in watercourses, in trenches where groundwater is present, or in trenches with grades greater than 5 percent.
- (2) Pea gravel or bedding stone, alone, shall not be used in the street right-of-way within 5 feet of subgrade elevation in trenches that are 3 feet or wider.
- (3) Each gravel or bedding stone, alone, shall not be used where the trench bottom, sides, or backfill is composed of non-cementitious, silty or sandy soils having plasticity indices less than 20, as determined by the E/A.
- (4) Sand, alone, shall not be used for installation of concrete storm water pipe unless the bedding envelope is wrapped with a geotextile membrane and the joints of the stormdrain conduit are wrapped to prevent the migration of fines into the bedding envelope and into the stormdrain conduit.
- (5) For concrete storm water pipe, if pea gravel, uncrushed gravel, crushed gravel, crushed stone, or combination thereof is used for pipe bedding material, a geotextile filter fabric shall be placed around the perimeter of the joint.

### (15) Laying Pipe

No pipe shall be installed in the trench until excavation has been completed, the bottom of the trench graded and the trench completed as indicated.

Laying of corrugated metal pipes on the prepared foundation shall be started at the outlet end with the separate sections firmly joined together, with outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides. Any metal in joints, which is not protected by galvanizing, shall be coated with suitable asphaltum paint. Proper facilities shall be provided for hoisting and lowering the sections of pipe into the trench without damaging the pipe or disturbing the prepared foundation and the sides of the trench. Any pipe which is not in alignment or which shows any undue settlement after laying or damage, shall be taken up and re-laid without extra compensation.

Multiple installations of corrugated pipe or arches shall be laid with the centerlines of individual barrels parallel. When not otherwise indicated, clear distances of 2 feet between outer surfaces of adjacent pipes shall be maintained.

No debris shall remain in the drainways or drainage structures.

All recommendations of the manufacturer shall be carefully observed during handling and installation of each material. Unless otherwise indicated, all materials shall be delivered to the project by the manufacturer or agent and unloaded as directed by the Contractor. Each piece shall be placed facing the proper direction near to where it will be installed.

The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times and stored in a manner that will protect them from damage. Stockpiled materials shall be stacked so as to minimize entrance of foreign matter.

The interior of all pipeline components shall be clean, dry and unobstructed when installed.

Piping materials shall not be skidded or rolled against other pipe, etc. and under no circumstances shall pipe, fittings or other accessories be dropped or jolted.

During handling and placement, materials shall be carefully observed and inspected and any damaged, defective or unsound materials shall be marked, rejected and removed from the job site. Minor damage shall be marked and repaired in a manner satisfactory to the E/A. Joints, which have been placed, but not joined, backfilled, etc., shall be protected in a manner satisfactory to the E/A.

# (16) Assembling of Pipe

Angular spacing of all joints shall meet the manufacturer's recommendations for the pipe and accessories being used. Side outlets shall be rotated so that the operating stems of valves shall be vertical when the valves are installed. Pressure pipe shall be laid with bell ends facing the direction of pipe installation. Pipe end bells shall be placed upgrade for all wastewater lines.

Orientation marks, when applicable, shall be in their proper position before pipe is seated.

Before joining any pipe, all foreign matter, lumps, blisters, excess coal tar coating, oil or grease shall be removed from the ends of each pipe and the pipe ends shall then be wire brushed and wiped clean and dry. Pipe ends shall be kept clean until joints are made.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation. No debris, tools, clothing or other materials shall be placed in the pipe.

## (17) Joints

(a) Mortar (Storm Drain joints only)

Pipe ends shall be clean, free of asphalt or other contaminants, which will inhibit the bond of the mortar to the pipe. The pipe ends shall be moistened immediately prior to placing the mortar in the joint.

(b) Cold Applied Preformed Plastic Gaskets (Storm Drain joints only)

The pipe ends shall be clean and the joint material applied to the dry pipe. In cold weather, the joint material shall be heated to facilitate the seal of the joint.

## (c) O-Ring and Push-on Joints

Just before making a joint the ends of the pipe shall be clean, dry, free of any foreign matter, lump blisters, excessive coal tar coating and grease or oil and shall be wire brushed. The gasket and the inside surface of the bell shall be lubricated with a light film of soft vegetable soap compound (Flax Soap) to facilitate telescoping the joints. The rubber gasket if not factory installed shall be stretched uniformly as it is placed in the spigot groove to insure a uniform volume of rubber around the circumference of the groove. The spigot shall be centered in the bell, the pipe pushed home uniformly and brought into true alignment. Bedding material shall be placed and tamped against pipe to secure the joint. Care should be taken to prevent dirt or foreign matter from entering the joint space.

#### (d) Bolted Joints

All flanged, mechanical or other bolted joints shall be joined with nuts and bolts and be coated as indicated above in Iron Pipe.

# (e) Storm Drain Joints

Storm drain joints sealed with preformed flexible joint sealants shall be provided and installed in compliance with ASTM C990. Storm drain joints sealed with rubber gaskets shall comply with ASTM C443 Install joint sealants in accordance with the pipe and joint sealant manufacturers' recommendations. Place the joint sealer so that no dirt or other deleterious materials come in contact with the joint sealing material. Pull or push home the pipe with enough force to properly seal the joint with the final joint opening (gap) on the inside of the installed pipe being less than or equal to the pipe manufacturer's recommended dimensions. Protrusion of joint material greater than 1/8 " into the interior of the pipe will not be accepted. Excess joint material will be removed to within 1/8 "of pipe surface. Observe joint sealant manufacturer's recommendations for installation temperature of the joint sealant. Apply joint sealant to pipe joint immediately before placing pipe in trench, and then connect pipe to previously laid pipe.

If inspection (video or other means) reveal C-990 joints that show signs of backfill infiltration, or where joints or conduits exhibit excessive joint gap or are otherwise defective, then the contractor has the following options:

- 1. Conduits less than 36-inches in any dimension: pour a concrete collar around the joint or wrap joint with a wrap meeting requirements of ASTM C-877 or approved equal.
- Conduits greater than or equal to 36-inches in all dimensions: repair joints using joint repair techniques recommended by the manufacturer to achieve a completed system that meets all Contract requirements.

## (18) Pressure Pipe Laying

(a) Grout for Concrete Steel Cylinder Pipe (CSC) and Welded Steel Pipe

Aggregate, cement, etc., shall be as indicated in "Mortar" herein. Potable water shall be used in the preparation of any cement, mortar, or grout lining.

Grout shall be poured into the recess between the bell and spigot on the outside of the pipe and contained by a joint wrapper ("diaper") recommended by the pipe manufacturer. The wrapper shall have a minimum width of 7 inches for 30 inch and smaller and 9 inches for larger pipe, secured to the pipe by "Band Iron" steel straps. The grout shall be poured in one continuous operation in such manner that after shrinkage and curing the joint recess shall be completely filled.

Mortar for the inside recess shall be of the consistency of plaster. The inside recess between the bell and spigot shall be filled with mortar after the pipe joint on either side of the recess has been backfilled and well tamped with no less than one pipe joint installed ahead of the pipe forming the recess. The mortar shall completely fill the recess and shall be trowelled and packed into place and finished off smooth with the inside of the pipe.

The Contractor shall inspect the joint after the mortar has set and make repairs of any pockets, cracks or other defects caused by shrinkage to the satisfaction of the E/A. The inside surface shall be cleared of any mortar droppings, cement, water, slurry, etc., before they have become set and shall be cleared of any other foreign matter. The inside surface of the pipe shall be left clean and smooth.

Pipe shall be handled at all times with wide non abrasive slings, belts or other equipment designed to prevent damage to the coating and all such equipment shall be kept in such repair that its continued use is not injurious to the coating. The use of tongs, bare pinchbars, chain slings, rope slings without canvas covers, canvas or composition belt slings with protruding rivets, pipe hooks without proper padding or any other handling equipment, which the E/A deems to be injurious to the coating, shall not be permitted. The spacing of

pipe supports required to handle the pipe shall be adequate to prevent cracking or damage to the cement mortar lining.

# (19) Placing Pipe in Tunnels

Piping installed as a carrier pipe in a tunnel, encasement pipe, etc., shall have uniform alignment, grade, bearing and conform to the reviewed Shop Drawings. All necessary casing spacers, bedding material, grout cradle or paving, bracing, blocking, etc., as stipulated by the Contract or as may be required to provide and maintain the required pipe alignment and grade, shall be provided by the Contractor at no cost except as provided by the Bid Items. This shall include casing spacers acceptable to the Owner attached to the carrier pipe in accordance with the manufacturer's recommendations. The insertion pushing forces shall not exceed the pipe manufacturer's recommendation. Such carrier piping shall have flexible bolted or gasketed push-on joints or Concrete Steel Cylinder pipe installed as follows:

## (a) 21 Inch Pipe and Smaller

Prior to placing the pipe in the tunnel, the inside joint recess at the bell shall be buttered with cement mortar.

After the joint is engaged, the excess mortar shall be smoothed by pulling a tight fitting swab through the joint. Cement mortar protection shall then be placed in the normal manner to the exterior of the joint and allowed to harden sufficiently to avoid dislodgment during installation. If time is of the essence, a quick setting compound may be used.

## (b) 24 Inch Pipe and Larger

Each length of pipe shall be pushed into the tunnel as single units. A flexible mastic sealer shall be applied to the exterior of the joint prior to joint engagement. The surfaces receiving the mastic sealer shall be cleaned and primed in accordance with the manufacturer's recommendation. Sufficient quantities of the mastic sealer shall be applied to assure complete protection of all steel in the joint area. The interior of the joint shall be filled with cement mortar in the normal manner after the pipe is in its final position within the tunnel.

# (20) Temporary Pipe Plugs, Caps, Bulkheads and Trench Caps

Temporary plugs, caps or plywood bulkheads shall be installed to close all openings of the pipe and fittings when pipeline construction is not in progress.

All temporary end plugs or caps shall be secured to the pipe as provided under Item No. 507, "Bulkheads".

Trench caps shall be reinforced Class D concrete as indicated.

### (21) Corrosion Control

#### (a) Protective Covering

Unless otherwise indicated, all flanges, nuts, bolts, threaded outlets and all other iron or steel components buried and in contact with earth or backfill shall be wrapped with 8-mil (minimum) polyethylene film meeting ANSI/AWWA C-105 to provide a continuous wrap.

### (22) Pipe Anchorage, Support and Protection

Pressure pipeline tees, plugs, caps and bends exceeding 22½ degrees; other bends as directed shall be securely anchored by suitable concrete thrust blocking or by approved metal harness. Unless otherwise indicated, on 24 inch or larger piping, all bends greater than 11 ¼ degrees shall be anchored as described herein.

Storm sewers on steep grades shall be lugged as indicated.

# (a) Concrete Thrust Blocking

Concrete for use as reaction or thrust blocking shall be Class B conforming to Item No. 403, "Concrete for Structures".

Concrete blocking shall be placed between solid ground and the fitting to be anchored. The area of bearing on the pipe and on the ground shall be as indicated or directed by the E/A. The blocking shall, unless otherwise indicated, be so placed that the pipe, fittings and joints will be accessible for repair.

The trench shall be excavated at least 6 inches outside the outermost projections of the pipe or appurtenance and the trench walls shaped or undercut according to the detail Drawings or as required to provide adequate space and bearing area for the concrete.

The pipe and fittings shall be adequately weighted and laterally braced to prevent floating, shifting or straining of the pipeline while the concrete is being placed and taking initial set. The Contractor shall be solely responsible for the sufficiency of such restraints.

# (b) Metal Thrust Restraint

Fabricated thrust restraint systems such as those described below may be approved for use instead of concrete blocking. To obtain approval, the project Drawings must include sufficient drawings, notes, schedules, etc., to assure that the proposed restraints as installed will be adequate to prevent undesirable movement of the piping components. Such restraint systems may only be used where and as specifically detailed and scheduled on approved Project Drawings.

#### 1. Thrust Harness

A metal thrust harness of tie rods, pipe clamps or lugs, turnbuckles, etc., may be approved. All carbon steel components of such systems, including nuts and washers, shall be hot-dip galvanized; all other members shall be cast ductile iron. After installation, the entire assembly shall be wrapped with 8-mil polyethylene film, overlapped and taped in place with duct tape to form a continuous protective wrap.

### 2. Restrained Joints

Piping or fitting systems utilizing integral mechanically restrained joints may be approved. All components of such systems shall be standard manufactured products fabricated from cast ductile iron, hot-dip galvanized steel, brass or other corrosion resistant materials and the entire assembly shall be protected with a continuous film wrap as described for 1. above. Manufacturers of pipe with restrained joints integral to the pipe shall be listed on SPL WW-27F. All pipe and fitting systems with restrained joints shall be identified by applying an adhesive-backed warning tape to the top of the pipe and for the full length of the pipe, regardless of the type of pipe. For plastic pipes the warning tape shall be applied directly to the top of the pipe. For metal pipes and fittings the warning tape shall be applied to the top of the polyethylene film wrap. The warning tape shall conform to 510.2(8)(b)5.

Location, configuration and description of such products shall be specifically detailed on the Drawings. (Add-on attachments such as retainer glands, all-thread rods, etc., are not acceptable.)

### (c) Concrete Encasement, Cradles, Caps and Seals

When trench foundation is excessively wet or unstable or installation of water or wastewater pipe will result in less than 30 inches of cover, Contractor shall notify E/A. E/A may require Contractor to install a concrete seal, cradle, cap, encasement or other appropriate action.

All concrete cap, etc., shall be continuous and begin and end within 6 inches of pipe joints. Concrete cap, cradle and encasement shall conform to City of Austin Standard No. 510S-1, "Concrete Trench Cap". The pipe shall be well secured to prevent shifting or flotation while the concrete is being placed.

## (d) Anchorage Bulkheads

Concrete bulkheads keyed into the undisturbed earth shall be placed as indicated to support and anchor the pipe and/or backfill against end thrust, slippage on slopes, etc. Concrete material and placement shall be Class A, Item No. 403, "Concrete for Structures".

# (e) Trench Caps, Concrete Rip-Rap and Shaped Retards

Where called for by the Contract or as directed by the E/A, concrete trench caps, concrete rip-rap and/or shaped retards shall be placed as detailed by the Drawings as protection against erosion. Concrete material and placement shall be Class B, Item No. 403, "Concrete for Structures".

## (23) Wastewater Connections

### (a) Connections to Mains 12 Inches and Smaller

All branch connections of new main lines shall be made by use of manholes.

Service stubs shall be installed as indicated. Minimum grade shall be 1 percent downward to main and minimum cover shall be 4½ feet at the curb. Standard plugs shall be installed in the dead end before backfilling.

Where a service connection to a main 12 inches or smaller is indicated, a wye, tee or double wye shall be installed.

Where a service connection to a main 15 inches or larger is indicated, a field tap may be made with the pipes installed crown to crown. The tap should be made conforming to the pipe manufacturer's recommendations with the E/A's approval.

Where not otherwise indicated, (wastewater) service connections shall be installed so that the outlet is at an angle of not more than 45 degrees above horizontal at the main line.

### (b) Connections to the Existing System

Unless otherwise specified by the E/A, all connections made to existing mains shall be made at manholes with the crown of the inlet pipe installed at the same elevation as the crown of the existing pipe. Service stubs installed on the existing system shall be installed by use of tapping saddles unless otherwise approved by the E/A. Extreme care shall be exercised to prevent material from depositing in the existing pipe as the taps are being made.

When connections to existing mains are made, a temporary plug approved by the E/A must be installed downstream in the manhole to prevent water and debris from entering the existing system before Final Completion. These plugs shall be removed after the castings are adjusted to finish grade or prior to Final Completion.

# (c) Connecting Existing Services to New Mains

Where wastewater services currently exist and are being replaced from the main to the property line, those services shall be physically located at the property line prior to installing any new mains into which the services will be connected. Where wastewater services currently exist but are not being replaced to the property line, those services shall

be physically located at the point of connection between the new and existing pipes prior to installing any new mains into which the services will be connected.

# (24) Potable or Reclaimed Water System Connections

All necessary connections of new piping or accessories to the existing potable or reclaimed water system shall be made by, and at the expense of, the Contractor. To minimize any inconvenience from outages, the Contractor shall schedule all such connections in advance and such schedule must be approved by the E/A before beginning any Work.

### (a) Shutoffs

The City will make all shutoffs on existing potable or reclaimed water mains. The Contractor shall be required to notify the Owner's Representative in writing a least twenty five (25) Calendar Days prior to the anticipated date for a wet-connection. The Owner's Representative is defined as the City Inspector. The Owner's Representative will notify any affected utility customers at least 48 hours prior to the shutoff. Austin Water (AW) will make the shutoff after ensuring that all appropriate measures have been taken to protect the potable or reclaimed water system, customers and employees.

The City will operate all valves to fill existing mains. Where a newly constructed main has not been placed in service and has only one connection to the potable or reclaimed system, the Contractor may operate one valve to fill the main after approval has been obtained from AW. The operation of the valve is to be conducted under the immediate supervision of the Owner's Representative.

Water for the Work shall be metered and furnished by the Contractor in accordance with Section 01500 of the Standard Contract Documents.

#### (b) Wet Connections to Existing Potable or Reclaimed Water System

The Contractor shall make all wet connections called for by the Contract or required to complete the Work. Two connections to an existing line performed during the same shutout, at the same time and at a distance less than 50 linear feet apart, will be considered one wet connection. Two connections to an existing line performed during the same shutout, at the same time and at a distance equal to, or greater than 50 linear feet will be considered two wet connections. A wet connection shall include draining and cutting into existing piping and connecting a new pipeline or other extension into the existing pressure piping, forming an addition to the potable or reclaimed water transmission and distribution network.

The Contract price for wet connections shall be full payment for all necessary shutoffs, excavation, removing plugs and fittings, pumping water to drain the lines, cutting in new fittings, blocking and anchoring piping, bedding and backfilling, placing the lines and service and all site cleanup.

No water containing detectable amounts of chlorine may be drained, released or discharged until specific planning and appropriate preparations to handle, dilute and dispose of such chlorinated water are approved in advance by the City and the disposal operations will be witnessed by an authorized representative from the City.

# (c) Pressure Taps to Existing Potable or Reclaimed Water System

The Contractor shall make all pressure taps called for by the Contract Documents or required to complete the Work. A pressure tap shall consist of connecting new piping to the existing potable or reclaimed water system by drilling into the existing pipe while it is carrying water under normal pressure without taking the existing piping out of service.

Unless otherwise provided by the Contract, the Contractor shall, at the Contractor's expense, perform all necessary excavation, furnish and install the tapping sleeve, valve and accessories, provide the tapping machine, drill the tap and shall block, anchor and backfill the piping, valve and all accessories, place the new piping in service and perform all site cleanup. When the City makes the tap, City forces are not obligated or expected to perform any Work except to provide tapping machine and drill the actual hole. If City crews are to make the tap, fiscal arrangements must be made in advance at the Taps Office, Waller Creek Center, 625 East 10th Street.

If a private Contractor makes the tap, an AW Inspector must be present. "Size on size" taps will not be permitted, unless made by use of an approved full bodied mechanical joint tapping sleeve. Concrete blocking shall be placed behind and under all tap sleeves 24 hours prior to making the wet tap.

#### (d) Service Connections

Service connection taps into PVC or AC pipe or into CI or DI pipe 12 inches or smaller shall be made using either a service clamp or saddle or a tapping sleeve as recommended by the pipe manufacturer and as approved by the E/A. Direct tapping of these pipes will not be permitted.

All potable or reclaimed water service connections shall be installed so that the outlet is at an angle of not more than 45 degrees above horizontal at the main line.

Precautions should be taken to ensure that the tapping saddle or sleeve is placed on the pipe straight to prevent any binding or deformation of the PVC pipe. The mounting chain or U-bolt strap must be tight.

Tapping shall be performed with a sharp shell type cutter so designed that it will smoothly penetrate heavy walled PVC DR14 and 200 psi AC and will retain and extract the coupon from the pipe.

# (25) Backfilling

#### (a) General

Special emphasis is placed upon the need to obtain uniform density throughout the backfill material. The maximum lift of backfill shall be determined by the compaction equipment selected and in no case shall it exceed 18 inches, loose measurement.

No heavy equipment, which might damage pipe, will be allowed over the pipe until sufficient cover has been placed and compacted. All internal pipe bracing installed or recommended by the manufacturer shall be kept in place until the pipe bedding and trench backfill have been completed over the braced pipe section. Testing of the completed backfill in streets and under and around structures shall meet the specified density requirements. Initial testing shall not be at Contractor's expense and shall conform to the "General Conditions."

# (b) General Corrugated Metal Pipe

After the corrugated metal pipe structure has been completely assembled on the proper line and grade and headwalls constructed where indicated; selected material free from rocks over 8 inches in size from excavation or borrow, as approved by the E/A, shall be placed along both sides of the completed structures equally, in uniform layers not exceeding 6 inches in depth (loose measurement), sprinkled if required and thoroughly compacted between adjacent structures and between the structures and the sides of the trench.

Backfill material shall be compacted to the same density requirements as indicated for the adjoining sections of embankment in accordance with the governing specifications thereof. Above the ¾ point of the structure, the fill shall be placed uniformly on each side of the pipe in layers not to exceed 12 inches, loose measure.

Prior to adding each new layer of loose backfill material, until a minimum of 12 inches of cover is obtained over the crown of the pipe, an inspection will be made of the inside periphery of the corrugated metal structure to determine if any floating, local or unequal deformation has occurred as a result of improper construction methods.

#### (c) Backfill Materials

The Engineer or designated representative may approve any of the following well graded materials as backfill:

- Select trench material
- 2. Sand
- 3. Crushed rock cuttings
- Rock cuttings
- 5. Foundation Rock
- 6. Blasted material with fines and rock
- 7. Cement stabilized material
- 8. Borrow

Within the 100-year flood plain, sand will not be permitted for backfilling. The Engineer or designated representative will approve the topsoil for areas to be seeded or sodded.

# (d) Backfill in Street Right-of-Way

Placement of backfill under existing or future pavement structures and within 2 feet of any structures shall be compacted to the specified density using any method, type and size of equipment, which will produce the specified compaction without damaging the pipe or bedding. Placement of backfill greater than 2 feet beyond structures in right-of-way shall conform to (g) below.

The thickness of lifts, prior to compaction, shall depend upon the type of sprinkling and compacting equipment used and the test results thereby obtained. Prior to and in conjunction with the compaction operation, each lift shall be brought to the moisture content necessary to obtain the specified density and shall be placed in a uniform thickness to ensure uniform compaction over the entire lift. Testing for density shall be in accordance with Test Method Tex-114-E and Test Method Tex-115-E.

It is highly desirable that the backfill lifts be placed in a flat (or level) configuration; however when approved by the Engineer or designated representative, the backfill lifts may be placed at gradients (percent of vertical rise or fall to horizontal run) that do not exceed 30%.

The proposed gradient for each lift or series of lifts shall be established based on the capabilities of the equipment proposed to attain the required compaction.

Each lift of backfill must provide the density as specified herein. Swelling soils (soils with a minimum Liquid Limit of 50, more than 50% passing a #200 sieve and a plasticity index greater than 22) shall be sprinkled as required to provide not less than optimum moisture nor more than 2 percent over optimum moisture content and compacted to the extent necessary to provide not less than 95 percent nor more than 102 percent of the density as

determined in accordance with Test Method Tex-114-E. Non-swelling soils shall be sprinkled as specified and compacted to the extent necessary to provide not less than 95 percent of the density as determined in accordance with Test Method Tex-114-E.

After each lift of backfill is complete, tests may be made by the Engineer or designated representative. If the material fails to meet the density indicated, the course shall be reworked as necessary to obtain the indicated compaction and the compaction method shall be altered on subsequent Work to obtain indicated density.

At any time, the Engineer or designated representative may order proof rolling to test the uniformity of compaction of the backfill lifts. All irregularities, depressions, weak or soft spots that develop shall be corrected immediately by the Contractor.

If the backfill, due to any reason, loses the specified stability, density or finish before the pavement structure is placed, it shall be recompacted and refinished at the sole expense of the Contractor. Excessive loss of moisture in the subgrade shall be prevented by sprinkling, sealing or covering with a subsequent backfill layer or granular material. Excessive loss of moisture shall be construed to exist when the subgrade soil moisture content is more than 4 percent below the optimum of compaction ratio density. Backfill shall be placed from the top of the bedding material to the existing grade, base course, subgrade or as specified. The remainder of the street backfill shall either be Flexible Base, Concrete or Hot Mix Asphalt Concrete as specified on the drawings or replacement "in kind" to the surface of the materials originally removed for placement of the pipe.

## (e) Backfill in County Street or State Highway Right-of-Way

All Work within the right-of-way shall meet the requirements of (d) above, as a minimum and shall meet the requirements of the permit issued by the County when their requirements are more stringent. Prior to the start of construction, the Contractor shall be responsible for contacting the appropriate TxDOT office or County Commissioner's Precinct Office and following the operating procedures in effect for utility cut permits and pavement repair under their jurisdiction. Approval for all completed Work in the State or County right-of-way shall be obtained from the appropriate Official prior to final payment by the Owner.

### (f) Backfill in Railroad Right-of-Way

All Work within the railroad right-of-way shall meet the requirements of (d) above, as a minimum and shall meet the requirements of the permit issued by the Railroad Owner when their requirements are more stringent. Approval for all completed Work in the railroad right of way shall be obtained from the Railroad prior to Final Completion.

## (g) Backfill in Easements

Where not otherwise indicated, Contractor may select whatever methods and procedures may be necessary to restore entire Work area to a safe, useful and geologically stable condition with a minimum density of 85 percent or a density superior to that prior to construction.

In and near flood plain of all streams and watercourses, under or adjacent to utilities, structures, etc. all backfill shall be compacted to a density of not less than 95 percent conforming to TxDOT Test Method Tex-114-E, unless otherwise directed by E/A.

All soil areas disturbed by construction shall be covered with top soil and seeded conforming to Item No. 604, "Seeding for Erosion Control". All turf, drainways and drainage structures shall be constructed or replaced to their original condition or better. No debris shall remain in the drainways or drainage structures.

# (h) Temporary Trench Repair/Surfacing

If details of temporary trench repair/surfacing are not provided in the contract documents, the Contractor shall submit for approval of the E/A (1) a plan for temporary trench repair for areas that will be open to traffic but will be excavated later for full depth repair, and (2) a proposed method for covering trenches to maintain access to properties. The temporary surfacing shall afford a smooth riding surface and shall be maintained by the Contractor the entire time the temporary surface is in place.

#### (i) Permanent Trench Repair

The Contractor shall install permanent trench repairs conforming to details in the drawings.

# (26) Quality Testing for Installed Pipe

# (a) Wastewater Pipe Acceptance Testing

After wastewater pipe has been backfilled, the Contractor shall perform infiltration tests, exfiltration tests, or low pressure air tests as determined by the E/A. In addition, the Contractor shall perform deflection tests and shall assist OWNER'S personnel, as directed, in performing pipeline settlement tests. The Contractor shall be responsible for making appropriate repairs to those elements that do not pass any of these tests.

#### (b) Exfiltration Test

Water for the Work shall be metered and furnished by the Contractor in accordance with Section 01500 of the Standard Contract Documents.

Exfiltration testing shall be performed by the Contractor when determined by the E/A to be the appropriate test method. Exfiltration testing shall conform to requirements of the Texas Commission on Environmental Quality given in the Texas Administrative Code Title 30 Part 1 Chapter 317 Rule §317.2.

# (c) Infiltration Test

Infiltration testing shall be performed by the Contractor when determined by the E/A to be the appropriate test method. Infiltration testing shall conform to requirements of the Texas Commission on Environmental Quality given in the Texas Administrative Code Title 30 Part 1 Chapter 317 Rule §317.2.

### (d) Pipeline Settlement Test

During the infiltration test or after the exfiltration test, the pipe will be TV inspected for possible settlement. When air testing has been used, water shall be flowed into the pipe to permit meaningful observations. Any pipe settlement which causes excessive ponding of water in the pipe shall be cause for rejection. Excessive ponding shall be defined as a golf ball (1 5/8 " dia.) submerged at any point along the line.

### (e) Low Pressure Air Test of Gravity Flow Wastewater Lines

## (1) General

Wastewater lines up to 33-inch diameter shall be air tested between manholes. Wastewater lines 36-inch in diameter and larger shall be either air tested between manholes or at pipe joints. Backfilling to grade shall be completed before the test and all laterals and stubs shall be capped or plugged by the Contractor so as not to allow air losses, which could cause an erroneous, test result. Manholes shall be plugged so they are isolated from the pipe and cannot be included in the test.

All plugs used to close the sewer for the air test shall be capable of resisting the internal pressures and must be securely braced. Place all air testing equipment above

ground and allow no one to enter a manhole or trench where a plugged sewer is under pressure. Release all pressure before the plugs are removed. The testing equipment used must include a pressure relief device designed to relieve pressure in the sewer under test at 10 psi or less and must allow continuous monitoring of the test pressures in order to avoid excessive pressure. Use care to avoid the flooding of the air inlet by infiltrated ground water. (Inject the air at the upper plug if possible.) Use only qualified personnel to conduct the test.

#### (2) Ground Water

Since the presence of ground water will affect the test results, test holes shall be dug to the pipe zone at intervals of not more than 100 feet and the average height of ground water above the pipe (if any) shall be determined before starting the test.

## (3) Test Procedure

The E/A may, at any time, require a calibration check of the instrumentation used. Use a pressure gauge having minimum divisions of 0.10 psi and an accuracy of 0.0625 psi. (One ounce per square inch.) All air used shall pass through a single control panel. Clean the sewer to be tested and remove all debris where indicated. Wet the sewer prior to testing. The average back pressure of any groundwater shall be determined (0.433 psi) for each foot of average water depth (if any) above the sewer.

Add air slowly to the section of sewer being tested until the internal air pressure is raised to 3.5 psig greater than the average back pressure of any ground water that may submerge the pipe. After the internal test pressure is reached, allow at least 2 minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure. After the temperature stabilization period, disconnect the air supply. Determine and record the time in seconds that is required for the internal air pressure to drop from 3.5 psig to 2.5 psig greater than the average backpressure of any ground water that may submerge the pipe.

For pipe less than 36-inch diameter, compare the time recorded with the time computed using the following equation:

 $T = (0.0850 \times D \times K) \div Q$ , where

T = time for pressure to drop 1.0 pounds per square inch gauge in seconds;

 $K = 0.000419 \times D \times L$ , but not less than 1.0

D = nominal inside diameter, in inches, as marked on the pipe;

L = length of line of same pipe size in feet; and

Q = rate of loss, 0.0015 cubic feet per minute per square foot of internal surface area (ft3/min/ft sq) shall be used.

Because a K value of less than 1.0 shall not be used, there are minimum test times for each pipe diameter as shown in the following table:

Table For Low Pressure Air Testing of Pipe

Pipe Diameter	Minimum Time	Minimum Time Applies to All Pipes Shorter than	Time for Longer Pipes
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(inches)	(seconds)	(feet)	(seconds)
8	454	298	1.520 × L
10 (See Note 1)	567	239	2.374 × L
12	680	199	3.419 × L
15	850	159	5.342 × L
18	1020	133	7.693 × L
21	1190	114	10.471 × L
24	1360	100	13.676 × L
30	1700	80	21.369 × L

Note 1. 10-inch diameter pipe to be used only by AW maintenance personnel.

Note 2. The test parameter for pipes larger than 30-inch diameter shall be shown on the construction plans.

Any drop in pressure, from 3.5 psig to 2.5 psig (adjusted for groundwater level), in a time less than that required by the above equation or table shall be cause for rejection. When the line tested includes more than one size pipe, the minimum time shall be that given for the largest size pipe included.

When joint testing, the minimum time allowable for the pressure to drop from 3.5 pounds per square inch to 2.5 pounds per square inch gauge during a joint test, regardless of pipe size, shall be twenty (20) seconds. A drop in pressure from 3.5 psig to 2.5 psig (adjusted for groundwater level) in less than twenty seconds shall be cause for rejection.

Manholes must be tested separately and independently. All manholes must be hydrostatically tested with a maximum loss allowance of 0.025 gallon per foot diameter per foot of head per hour.

When lines are air tested, manholes are to be tested separately by exfiltration or vacuum method (see Standard Specification Item No. 506S, "Manholes").

### (f) Deflection Test

Deflection tests shall be performed by the Contractor on all flexible and semi-rigid wastewater pipes. The tests shall be conducted after the final backfill has been in place at least 30 days. Testing for in-place deflection shall be with a pipe mandrel at 95% of the inside diameter of the pipe. A second test of flexible and semi-rigid wastewater pipes 18

inch size and larger, also with a pipe mandrel sized at 95% of the inside diameter of the pipe, shall be conducted by the Contractor 30 days before the warranty expires on the Contractor's Work.

Contractor shall submit proposed pipe mandrels to the E/A or the E/A's designated representative for concurrence prior to testing the line.

Test(s) must be performed without mechanical pulling devices and must be witnessed by the E/A or the E/A's designated representative.

Any deficiencies noted shall be corrected by the Contractor and the test(s) shall be redone.

# (g) Inspection of Installed Storm Drain Conduits

# (1) General

All storm drain conduits (pipe and box culvert) shall be inspected for conformance to the requirements of this specification. Smart Housing, low/moderate income housing, and projects that are 100-percent privately funded are exempt from the cost of the initial video inspection. All deficiencies revealed by inspection shall be corrected. Video re-inspection meeting the requirements of this specification shall be provided at the Contractor's expense to show that deficiencies have been corrected satisfactorily. Further, the contractor shall provide video in complete segments (manhole to manhole) versus specific deficiency locations.

Projects that are not exempt from the cost of the initial video inspection are also subject to the following constraints:

- All inspectors utilized by the Contractor for video inspection shall be NASSCO-PACP certified for a minimum of 3 years.
- The Contractor will be required to inspect, assess, and record the condition of the storm drain pipe using National Association of Sewer Service Companies (NASSCOs) Pipeline Assessment Certification Program (PACP) coding standards.
  - (2) Video Inspection of Installed Storm Drain Conduits

Contractor shall provide all labor, equipment, material and supplies and perform all operations required to conduct internal closed-circuit television and video recording of all storm drain conduits. Video recording of each storm drain conduit section shall be conducted after the trench has been backfilled and prior to placement of permanent pavement repairs or permanent pavement reconstruction. The video recording shall be provided to the Owner for review. Contractor shall not place permanent pavement repairs or permanent pavement reconstruction over the storm drain conduit until Owner has reviewed the video and agrees that there are no defects in the storm drain conduit installation shown in the video submitted by the Contractor or shown in any video acquired by the Owner through other means. Placement of permanent pavement repair or permanent pavement reconstruction over the installed storm drain conduit before the Owner acknowledges no defects shall be at the Contractor's risk. Any defects revealed by the video inspection shall be corrected at the Contractor's expense and a new video submitted to the Owner for review prior to acceptance of the conduit.

All video work shall be conducted under the direct full-time supervision of a NASSCO-PACP certified operator.

The conduit inspection camera shall have the capability of panning plus/minus 275 degrees and rotating 360 degrees. The television camera shall be specifically designed and constructed for such use. The camera shall be operative in 100% humidity conditions. Camera shall have an accurate footage counter that displays on the monitor the exact distance of the camera (to the nearest tenth of a foot) from the centerline of the starting manhole or access point. Camera shall have height adjustment so that the camera lens is always centered within plus/minus 10% of the center axis of the conduit being videoed. Camera shall provide a minimum of 460 lines of horizontal resolution and 400 lines of vertical resolution. Camera shall be equipped with a remote iris to control the illumination range for an acceptable picture. Geometrical distortion of the image shall not exceed one percent (1%). The video image produced by each camera shall be calibrated using a Marconi Resolution Chart No. 1 or equivalent.

Lighting for the camera shall be sufficient to allow a clear picture of the entire periphery of the conduit without loss of contrast, flare out of picture or shadowing. A reflector in front of the camera may be required to enhance lighting in dark or large sized conduit. The video camera shall be capable of showing on the digital display the Owner's name, Project name, Contractor name, date, line size and material, conduit identification, and ongoing footage counter. The camera, television monitor, and other components of the video system shall be capable of producing a picture quality satisfactory to the satisfaction of the Owner. The recording of the internal condition of the storm drain conduit shall be clear, accurate, focused and in color. If the recording fails to meet these requirements, the, equipment shall be removed and replaced with equipment that is suitable. No payment will be made for an unsatisfactory recording.

If during video inspection, water is encountered inside the conduit, the conduit shall be dewatered by the Contractor. The storm drain section must be dry. Video recording conducted while the camera is floating is not acceptable unless approved by the Owner.

If during video inspection, debris is encountered that prohibits a proper inspection of the conduit, the Contractor shall remove the debris before proceeding.

All video shall be documented using a data logger and reporting system that are PACP compliant and which use codes as established by the National Association of Sewer Service Companies (NASSCO)s - Pipeline Assessment and Certification Program (PACP).

Computer printed location records shall be kept by the Contractor and shall clearly show the location and orientation of all points of significance such as joints, conduit connections, connections at manholes and inlets, and defects. Copy of all records shall be supplied to the Owner. Noted defects shall be documented as color digital files and color hard copy print-outs. Photo logs shall accompany each photo submitted.

The video recording shall supply a visual and audio record of the storm drain conduits that may be replayed. Video recordings shall include an audio track recorded by the video technician during the actual video work describing the parameters of the storm drain conduit being videoed (i.e. location, depth, diameter, pipe material), as well as describing connections, defects and unusual conditions observed during the video work. Video recording playback shall be at the same speed that it was recorded. Slow motion or stop-motion playback features may be supplied at the option of the Contractor. Once videoed, the CDs/DVDs shall be labeled and become the property of the Owner. The Contractor shall have all video and necessary playback equipment readily accessible for review by the Owner while the project is under construction.

Post-installation video shall not be completed until all work is completed on a section of storm drain conduit. Post-installation video work shall be completed by the Contractor in the presence of the Owner. The post-installation video work shall be completed to confirm that the storm drain conduits are free of defects. Provide a color video showing the completed work. Prepare and submit video logs providing location of storm drain conduit along with location of any defects. Manhole and inlet work shall be complete prior to post-installation video work.

For post-installation video, exercise the full capabilities of the camera equipment to document the completion and conformance of the storm drain installation work with the Contract Documents. Provide a full 360-degree view of conduit, all joints, and all connections. The camera shall be moved through the storm drain conduit in either direction at a moderate rate, stopping and slowly panning when necessary to permit proper documentation of the conduit condition at each pipe connection, joint, and defect. In no case shall the camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the storm drain conditions shall be used to move the camera through the storm drain conduit. When manually operated winches are used to pull the camera through the conduit, telephones or other suitable means of communication shall be set up between the two access points of the conduit being videoed to insure good communication between members of the video crew.

Distance measurements shall be provided to an accuracy of one tenth of a foot.

Video shall be continuous for each storm drain conduit segment. Do not show a single segment on more than one CD/DVD, unless specifically allowed by the Owner.

Contractor shall submit to Owner the following:

- A. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) certification of operators who will be performing video work.
- B. Compact Disc (CD) or Digital Video Disc (DVD) of recording of storm drain conduits (concrete storm water pipe or box culvert).
  - a. The color CD or DVD shall include a digital color key map in a format acceptable to the Owner with each segment of storm drain conduit labeled with the appropriate inspection ID on the map.
  - b. The file folder for each segment of the storm drain conduit shall have a unique name based on the Owner's approved inspection naming convention and shall contain the following:
    - i. Video files
    - ii. Video inspection logs with information coded in accordance with the PACP
    - iii. Photo logs
    - iv. A report summarizing the results of the video inspection
    - v. A proposed method of repair for any defects discovered.
- (3) Time commitments from City for projects that are exempt from the cost of the initial video inspection

Projects that are exempt from the cost of the initial video inspection are afforded the following time commitments from the City.

- A. Initial inspection contractor must inform the City of Austin construction inspector assigned to the project in writing that all stormdrain infrastructure for the project has been completed according to the permit and is ready for inspection. The inspector will then notify the Watershed Protection Department (WPD) in writing that the all of the stormdrain infrastructure for the project has been completed and is ready for inspection. The WPD is allowed 15-days to complete inspection from written notification by the inspector. The outcome of this item does not impact the one-year warranty requirements.
- B. Video re-inspection by the contractor for deficient installed stormdrain infrastructure. The contractor must submit the video inspection data as defined in this specification to the City of Austin construction inspector assigned to the project along with a written letter of transmittal certified by a professional engineer stating that all identified stormdrain infrastructure installation deficiencies for the project have been corrected. The inspector will then notify the Watershed Protection Department (WPD) in writing and convey the video inspection data to the WPD. The WPD is allowed 15-days to complete review of the data from the date of delivery by the inspector.

#### (27) Pressure Pipe Hydrostatic Testing

After the pipe has been installed and backfilled and all service laterals, fire hydrants and other appurtenances installed and connected, a pressure test, followed by a leakage test, will be conducted by the City. The City will furnish the pump and gauges for the tests. The Contractor shall be present and shall furnish all necessary assistance for conducting the tests. The specified test pressures will be based on the elevation of the lowest point of the line or section under test. Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points.

All drain hydrant and fire hydrant leads, with the main 6-inch gate valve open, the hydrant valve seats closed and no nozzle caps removed, shall be included in the test.

## (a) Pressure Test

The entire project or each valved section shall be tested, at a constant pressure of 200 psi for a sufficient period (approximately 10 minutes) to discover defective materials or substandard work. The Contractor assumes all risks associated with testing against valves. Repairs shall be made by the Contractor to correct any defective materials or substandard work. The Contractor shall pre-test new lines before requesting pressure tests by City Forces. The Contractor shall have new lines pressurized to a minimum of 100 psi, on the date of testing, prior to arrival of City Forces.

# (b) Leakage Test

A leakage test will follow the pressure test and will be conducted on the entire project or each valved section. The Contractor assumes all risks associated with testing against valves. The leakage test shall be conducted at 150 psi for at least 2 hours. The test pressure shall not vary by more than ±5 psi for the duration of the test.

# (1) Allowable Leakage

Leakage shall be defined as the quantity of water that must be supplied into any test section of pipe to maintain the specified leakage test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

No pipe installation will be accepted if leakage exceeds the amount given by the following formula:

Allowable leakage (gal/hr) =  $[L \times D] \div 10,875$ 

# Where L = length of pipe tested, in feet D= nominal pipe diameter, in inches, as marked on the pipe

#### (2) Location and Correction of Leakage

If such testing discloses leakage in excess of this specified allowable, the Contractor, at the Contractor's expense, shall locate and correct all defects in the pipeline until the leakage is within the indicated allowance.

All visible leakage in pipe shall also be corrected by Contractor at the Contractor's expense.

## (28) Service Charges for Testing

Initial testing performed by City forces for the Contractor will be at the City's expense. Retesting, by City forces, of Contractor's work that fails initial testing will be at the Contractor's expense. The City's charge for retests will be a base fee plus an hourly rate published in the current AW Fee Schedule. On City-funded projects, the charges incurred by the City for retesting will be deducted from funds due the Contractor. On non-City-funded projects, the charges incurred by the City for retesting will be billed to the Contractor. The City will withhold acceptance of the Contractor's work until the Contractor has paid the City for the retesting costs.

#### (29) Disinfection of Potable Water Lines

Prior to performing any disinfection of potable water lines, the Contractor shall submit a Disinfection Plan (Plan) and obtain approval in accordance with COA specification 01300. Submittals. The Plan shall comply with AWWA C651 (Disinfecting Water Mains) and AWWA C655 (Field Dechlorination), latest editions, and shall be developed using one of the following templates, unless otherwise approved by the Engineer and/or AW: Disinfection Plan for Tablet/Granule Method, or Disinfection Plan for Continuous-Feed Method. Templates for these two methods are located at http://www.austintexas.gov/department/construction-standards. The Contractor shall decide which disinfection method to use for a given project. The Slug Method and Spray Method are also acceptable if better suited for disinfection. The initial plan shall be submitted for review a minimum of 60 calendar days prior to when the water main is scheduled to be placed into service, or at the preconstruction conference if the project requires that the waterline be placed in service in less than 60 days, as indicated in the Contractor's Construction Schedule. If any appurtenances are required for injection, sampling, or flushing purposes that are not shown in the original plan/profile sheets, then the Contractor shall include the appurtenances in the project Record Drawings. The Contractor shall disinfect potable water lines only in accordance with an approved Plan.

# (a) Preventing Contamination

The Contractor shall protect all piping materials from contamination during storage, handling and installation. Prior to disinfection, the pipeline interior shall be clean, dry and unobstructed. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work.

#### (b) Cleaning

Prior to disinfection the Contractor shall clean the pipeline to remove foreign matter. For pipelines 16" in diameter or smaller, cleaning shall consist of flushing the pipeline. For pipelines greater than 16" in diameter, cleaning shall be performed by operating hydrants and blow-offs located at low points in the pipeline, or by mechanical means (sweeping or pigging. Water for the Work shall be metered and furnished by the Contractor in accordance with Section 01500 of the Standard Contract Documents.

## (c) Procedure and Dosage

For pipelines 16" or smaller in diameter, the Contractor may use either the AWWA C-651 "Tablet/Granular Method" or the "Continuous Feed Method" for disinfecting the pipeline. The Contractor, at its expense, will supply the test gauges and the Sodium Hypochlorite conforming to ANSI/AWWA B300, which contains approximately 5 percent to fifteen percent available chlorine, and will submit for approval a written plan for the disinfection process. Calcium Hypochlorite conforming to ANSI/AWWA B300, which contains approximately 65 percent available chlorine by weight, may be used in granular form or in 5 g tablets for 16" diameter or smaller lines, if it is included as part of the written plan of disinfection that is approved by the City of Austin. The Contractor, at its expense, shall provide all other equipment, supplies and the necessary labor to perform the disinfection under the general supervision of the City.

One connection to the existing system will be allowed with a valve arranged to prevent the strong disinfecting dosage from flowing back into the existing water supply piping. The valve shall be kept closed and locked in a valve box with the lid painted red. No other connection shall be made until the disinfection of the new line is complete and the water samples have met the established criteria. The valve shall remain closed at all times except when filling or flushing the line and must be staffed during these operations. As an option, backflow prevention in the form of a reduced pressure backflow assembly may be provided if the valve is left unattended. The new pipeline shall be filled completely with disinfecting solution by feeding the concentrated chlorine and approved water from the existing system uniformly into the new piping in such proportions that every part of the line has a minimum concentration of 25 mg/liter available chlorine.

The disinfecting solution shall be retained in the piping for at least 16 hours and all valves, hydrants, services, stubs, etc. shall be operated so as to disinfect all their parts. After this retention period, the water shall contain no less than 10 mg/liter chlorine throughout the treated section of the pipeline.

For pipelines larger than 16" in diameter, the Contractor may use the AWWA C-651 "Slug Method" for disinfecting the pipeline. Chlorine shall be fed at a constant rate and at a sufficient concentration at one end of the pipeline to develop a slug of chlorinated water having not less than 100 mg/liter of free chlorine. The Contractor shall move the slug through the main so that all interior surfaces are exposed to the slug for at least three (3) hours. The chlorine concentration in the slug shall be measured as it moves through the pipeline. If the chlorine concentration drops below 50 mg/liter, the Contractor shall stop the slug and feed additional chlorine to the head of the slug to restore the chlorine concentration to at least 100 mg/liter before proceeding. As the slug flows past fittings and valves, related valves and hydrants shall be operated so as to disinfect appurtenances and pipe branches.

Unless otherwise indicated, all quantities specified herein refer to measurements required by the testing procedures included in the current edition of "Standard Methods". The chlorine concentration at each step in the disinfection procedure shall be verified by chlorine residual determinations.

## (d) Final Flushing

The heavily chlorinated water shall then be carefully flushed from the potable water line by a dechlorination process until the chlorine concentration is no higher than the residual generally prevailing in the existing distribution system. This is necessary to insure that there is no injury or damage to the public, the water system or the environment. The plans and preparations of the Contractor must be approved by the City before flushing of the line may begin. The Contractor will supply the Dechlorination chemical conforming to ANSI/AWWA C655. Additionally the flushing must be witnessed by an authorized representative of the City.

Approval for discharge of the diluted chlorine water or heavily chlorinated water into the wastewater system must be obtained from AW. The line flushing operations shall be regulated by the Contractor so as not to overload the wastewater system or cause damage to the odor feed systems at the lift stations. The City shall designate its own representative to oversee the work.

Daily notice of line discharging must be reported to the AW Dispatch office.

# (e) Bacteriological Testing

After disinfection and final flushing, samples shall be collected per one of the two options. Option A: Before approving a main for release, take an initial set of samples and then resample again after a minimum of 16 hours. Both sets of samples must pass for the main to be approved for release. Option B: Before approving a main for release, let it sit for a minimum of 16 hours without any water use. Then collect two sets of samples a minimum of 15 minutes apart while the sampling taps are left running. Both sets of samples must pass for the main to be approved for release. The two (2) sets of water samples from the line will be tested for bacteriological quality by the City and must be found free of coliform organisms before the pipeline may be placed in service. Each set shall consist of one (1) sample that is drawn from the end of the main, at least one from each branch greater than one pipe length, and additional samples that are collected at intervals of not more than 1,200 feet along the pipeline. All stubs shall be tested before connections are made to existing systems.

The Contractor, at its expense, shall install sufficient sampling taps at proper locations along the pipeline. Each sampling tap shall consist of a standard corporation cock installed in the line and extended with a copper tubing gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use.

Samples for bacteriological analysis will only be collected from suitable sampling taps in sterile bottles treated with sodium thiosulfate. Samples shall not be drawn from hoses or unregulated sources. The City, at its expense, will furnish the sterile sample bottles and may, at its discretion, collect the test samples with City personnel.

If the initial disinfection fails to produce acceptable sample test results, the disinfection procedure shall be repeated at the Contractor's expense. Before the piping may be placed in service, two (2) consecutive sets of acceptable test results must be obtained.

An acceptable test sample is one in which: (1) the chlorine level is similar to the level of the existing distribution system; (2) there is no free chlorine and (3) total coliform organisms are absent. An invalid sample is one, which has excessive free chlorine, silt or non-coliform growth as defined in the current issue of the "Standards Methods." If unacceptable sample results are obtained for any pipe, the Contractor may, with the concurrence of the Inspector, for one time only flush the lines and then collect a second series of test samples for testing by the City. After this flushing sequence is completed, any pipe with one or more failed samples must be disinfected again in accordance with the approved disinfection procedure followed by appropriate sampling and testing of the water.

The City of Austin Water Quality Laboratory will notify the assigned City of Austin Inspector in writing of all test results. The Inspector will subsequently notify the Contractor of all test results. The Water Quality Laboratory will not release test results directly to the Contractor.

#### (30) Cleanup and Restoration

It shall be the Contractor's responsibility to keep the construction site neat, clean and orderly at all times. Cleanup shall be vigorous and continuous to minimize traffic hazards or obstructions along the streets and to driveways. Trenching, backfill, pavement repair (as necessary), and cleanup shall be coordinated as directed by the City. The E/A will regulate

the amount of open ditch and may halt additional trenching if cleanup is not adequate to allow for orderly traffic flow and access.

Materials at the site shall be stored in a neat and orderly manner so as not to obstruct pedestrian or vehicular traffic. All damaged material shall be removed from the construction site immediately and disposed of in a proper manner. All surplus excavated materials shall become the property of the Contractor for disposal at the Contractor's expense. After trenching, the Contractor shall immediately remove all excavated materials unsuitable for or in excess of, backfill requirements. Immediately following the pipe laying Work as it progresses, the Contractor shall backfill, grade and compact all excavations as provided elsewhere. The backfill placed at that time shall meet all compaction test requirements. The Contractor shall immediately clean up and remove all unused soil, waste and debris and restore all surfaces and improvements to a condition equal or superior to that before construction began and to an appearance which complements the surroundings. The Contractor shall grade and dress the top 6 inches of earth surfaces with soil or other material similar and equal to the surrounding, fill and smooth any visible tracks or ruts, replace and re-establish all damaged or disturbed turf or other vegetation and otherwise make every effort to encourage the return of the entire surface and all improvements to a pleasant appearance and useful condition appropriate and complementary to the surroundings and equal or similar to that before construction began.

Placement of the final lift of permanent pavement, if a pavement is required, shall begin immediately after all testing of each segment of piping is satisfactorily completed.

#### (31) Valve Turn Walk-though

As part of the acceptance of Water or Reclaimed Water pressure pipe, an AW Valve Walkthrough will be performed after an initial inspection by the Owner's Representative to identify any deficient items. If deficient items are present during the AW Valve Walk-Through and the project fails acceptance, a re-inspection fee will apply and must be paid before a re-inspection is scheduled to confirm correction of deficient items. See AW Fee Schedule for the current Distribution Walk-Through Re-inspection Fee.

#### (32) 2-inch Jumper Hose

During connections to the water distribution system, the Contractor may be required to install a temporary jumper hose between the unpressurized water segment and an adjacent pressurized water segment for the purpose of maintaining water service to customers who can't operate without water service during the connection. The jumper shall include an approved backflow preventer and be of adequate size and pressure rating to maintain service to the customer. It shall be polyethylene tubing meeting the requirements of COA SPL WW-65. The jumper hose and other components in the temporary service shall be disinfected, and bacteriological samples will be taken and pass before the temporary service is provided to the customer. Contractor shall provide adequate protection for the jumper hose in vehicular traffic areas at all times during use.

Source: Rule No. R161-17.05, 5-31-2017; Rule No. R161-17.19, 11-28-2017; Rule No. R161-18.23, 12-8-2018.

#### 510.4 - Measurement

Pipe will be measured by the linear foot for the various types, sizes and classes. Parallel lines will be measured individually.

Where a line ties into an existing system, the length of the new line will be measured from the visible end of the existing system at the completed joint. Unless otherwise indicated, the length of water, reclaimed,

and wastewater lines will be measured along pipe horizontal centerline stationing through fittings, valves, manholes, and other appurtenances.

Ductile iron fittings, whether standard mechanical joint or integral factory restrained joint type, will be measured by the ton and paid for in accordance with the schedule in Standard Products List WW-27C. Bolts, glands and gaskets will not be measured for payment. Steel cylinder concrete pipe fittings and welded steel pipe fittings will not be measured separately and are included in the unit price for the respective pipe bid items.

Factory restrained joint pipe meeting the requirements of Standard Products List WW-27F will be measured by the linear foot. The estimated quantity on the bid form is only for restrained joint pipe having integral mechanically restrained joints.

Connecting a new water, wastewater, or reclaimed water service to an existing, comparable type of private service will be measured by each connection. Service pipe from the main to the service connection will be measured by the linear foot.

The Contractor shall be responsible for removing and treating ground water flowing into a trench up to a baseline flow rate of 350 gpm of sustained flow for each mainline open trench (no more that 300 linear feet open trench per work zone segment is allowed at one time). This baseline flow rate is not a prediction of ground water conditions to be expected on the Project. Rather, it establishes contract terms regarding the quantity of ground water for which the contractor is responsible without extra or separate compensation. The flow rate must exceed 350 gpm continuously for at least 4 consecutive hours to be considered sustained flow. It is expected that trench dewatering for this baseline rate may be accomplished with a single 3-inch trash-type pump per open trench; however, measured flow rate, not pump size, type or characteristics shall be used to determine if the baseline rate has been exceeded. Flow rate shall be determined by measurements made at the discharge point of the water treatment facilities. Surface storm water flowing into a trench shall be the Contractor's responsibility to remove and treat without compensation, regardless of inflow rate or volume.

Adjustment of elevations during construction resulting in changes in flow line elevations of plus or minus two feet or less will not be considered for credit or additional compensation and no measurement for payment will be made.

Stormwater pipe will be measured along the slope of the pipe. Where drainage pipe ties into inlets, headwalls, catch basins, manholes, junction boxes or other structures that length of pipe tying into the structure wall will be included for measurement but no other portion of the structure length or width will be so included.

Excavation and backfill, when included as pipe installation will not be measured as such but shall be included in the unit price bid for constructing pipe and measured as pipe complete in place including excavation and backfill.

When pay items are provided for the other components of the system, measurement will be made as addressed hereunder.

Video inspection of newly installed box culverts and storm drain pipe will be measured per linear foot of pipe videoed.

Jumper hose will be measured per linear foot of hose installed, including all depths, excavation and backfill, complete, and in place.

Source: Rule No. R161-17.05, 5-31-2017.

510.5 - Payment

Payment for pipe, measured as prescribed above, will be made at the unit price bid per linear foot for the various sizes of pipe, of the materials and type indicated, unless unstable material is encountered or trench excavation and backfill is bid as a separate item.

The concrete seal, foundation rock or coarse aggregate when used as directed in unstable material will be paid for at the unit price bid per cubic yard, which shall be full payment for all excavation and removal of unsuitable material and furnishing, placing and compacting the foundation rock, coarse aggregate or other approved material all complete in place.

Excavation and backfill, when included as a separate pay item, will be paid for by Pay Item No. 510-E or 510-F.

No separate payment will be made for dewatering a trench with ground water inflow of less than the baseline rate of 350 gpm of sustained flow as described above. Dewatering of those trenches shall be included in the contract unit price of the Pipe pay item. Payment for dewatering a trench with ground water inflow exceeding 350 gpm of sustained flow shall be agreed by change order. Dewatering of bore pits shall be included in the contract unit price for Bore Entry Pit or Exit Pit regardless of inflow rate or volume unless specified otherwise in the bid item for Bore Entry Pit or Exit Pit.

# (1) Pipe

Payment for pipe, measured as prescribed above, will be made at the unit price bid per linear foot complete-in-place as designed and represented in the Drawings and other Contract documents. Restrained joint pipe meeting the requirements of Standard Products List WW-27F will be paid for separately at the unit price bid per linear foot. Unless otherwise provided herein, as separate pay item(s), the bid price per linear foot of pipe shall include the following:

- a. clearing
- b. constructing any necessary embankment
- c. excavation
- d. disposal of surplus or unusable excavated material
- e. furnishing, hauling and placing pipe
- f. field constructed joints, collars, temporary plugs, caps or bulkheads
- g. all necessary lugs, rods or braces
- h. pipe coatings and protection
- connections to existing systems or structures, concrete blocking and thrust blocks and restrained joints
- j. preparing, shaping, pumping for dewatering, and shoring of trenches
- k. bedding materials
- I. backfill materials
- m. hauling, placing and preparing bedding materials
- n. particle migration measures
- o. hauling, moving, placing and compacting backfill materials
- p. temporary and permanent pavement repairs and maintenance
- q. temporary removal and replacement of pavement, curb, drainage structures, driveways, sidewalks and any other improvements damaged or removed during construction
- r. cleanup
- s. vertical stack on deep wastewater services

- t. all other incidentals necessary to complete the pipe installation as indicated.
- u. pipe joint restraint devices, where specified or allowed, meeting Standard Products List WW-27A or WW-27G.

No separate payment will be made for thrust restraint measures.

Steel cylinder concrete pipe fittings and welded steel pipe fittings will not be paid for separately. These will be included in the unit price bid for the bid item Pipe.

#### (2) Concrete Cradles and Seals

When called for in the Bid, concrete cradles and seals will be paid for at the unit Contract price bid per linear foot for the size of pipe specified, complete in place.

#### (3) Concrete Retards

When called for in the Bid, Concrete retards will be paid under Item No. 593S, Concrete Retards."

#### (4) Boring or Jacking.

When called for in the Bid, boring or jacking will be paid under Item 501S, "Jacking or Boring Pipe.

## (5) Wet Connections to Potable or Reclaimed Water Mains

When called for in the bid, wet connections will be paid at the unit price bid per each, complete in place, according to the size of the main that is in service and shall be full compensation for all Work required to make the connection and place the pipe in service. (See subsection 510.3 'Construction Methods' part (24) (b) 'Wet Connections to Existing Water System').

## (6) Fittings

Ductile iron fittings, furnished in accordance with these specifications, will be paid for at the unit price bid per ton, complete in place, according to the schedule of weights in Standard Products List WW-27C. Bolts, glands, and gaskets will not be paid for separately and shall be included in the contract unit price for fittings.

#### (7) Concrete Trench Cap and Encasement

Where the distance between the top of the concrete encasement and the top of the trench cap is less than 36 inches, the concrete cap and encasement shall be poured as one unit and paid for under this bid item at the Contract price bid per linear foot. When the distance above is greater than 36 inches or when the trench cap is placed separately, the trench cap shall be paid for as a separate item, per linear foot, complete in place.

#### (8) Cement-Stabilized Backfill

Cement-stabilized backfill will be paid for at the unit price bid per linear foot and shall be full payment to the Contractor for furnishing and installing the required material, mixed, placed and cured complete in place.

#### (9) Concrete Encasement

When called for in the Bid, Concrete Pipe Encasement will be paid under Item No. 505S, "Encasement and Encasement Pipe".

#### (10) Pressure Taps

Pressure taps will be paid for at the unit price bid, complete in place, according to the size tap made and the size main tapped and shall be full payment for furnishing all necessary materials,

including tapping sleeve and valve, making the tap, testing and placing the connection in service.

# (11) Excavation Safety Systems

When called for in Bid, Trench Safety Systems shall conform to Item No. 509S, "Excavation Safety Systems."

- (12) Connecting a New Water, Wastewater, or Reclaimed Water Service to an existing, comparable type of private service will be paid for at the unit price bid, complete in place, according to the size of new service and size of existing private service, and shall be full payment for furnishing and installing all necessary materials, such as cleanouts, pipe, couplings, and fittings, and including excavation and backfill.
- (13) Video Inspection

Video Inspection of Newly Installed Box Culverts and Storm Drain Pipe will be paid for at the unit price bid per linear foot and shall be full payment for all labor, equipment, and materials required for video inspection per this specification, including all submittals of CD/DVD as required.

#### (14) Jumper Hose

Jumper Hose will be paid at the unit bid price, complete and in place, including installation and removal of all materials necessary to provide a fully functional jumper hose. This item shall also include adequate protection for the jumper hose within vehicular traffic areas.

Source: Rule No. R161-17.05, 5-31-2017.

Payment, when included as a Contract pay item, will be made under one of the following:

Pay Item No. 510- ARDia.:	Pipe, Dia Type (all depths), including Excavation and Backfill	Per Linear Foot.
Pay Item No. 510-	Factory Restrained Joint Pipe, Dia., Class Ductile Iron,	Per Linear
ARRJDia.:	(all depths) including Excavation and Backfill	Foot.
Pay Item No. 510- BR×Dia.:	Connecting New Service to Existing Private Service ( Dia. New Service to Dia. Private Service)	Per Each.
Pay Item No. 510-CR:	Pipe Excavation, Ft. Width	Per Linear Foot.
Pay Item No. 510-DR:	Pipe Trench Backfill, Ft. Width	Per Linear Foot.
Pay Item No. 510-ER:	Concrete Seal or Cradle, Dia. Pipe	Per Linear Foot.

Pay Item No. 510-FR:	Concrete Trench Cap, Ft. Width	Per Linear Foot.
Pay Item No. 510-GR:	Concrete Cap and Encasement, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-HR:	Cement Stabilized Backfill, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-IR: × Dia.:	Pressure Taps, Dia. × Dia.	Per Each.
Pay Item No. 510-JR: × Dia.:	Wet Connections, Dia. × Dia.	Per Each.
Pay Item No. 510-KR:	Ductile Iron Fittings	Per Ton.
Pay Item No. 510- ASDDia.:	Pipe, Dia. (all depths), including excavation and backfill	Per Linear Foot.
Pay Item No. 510-CSD:	Pipe Excavation, Ft. Width	Per Linear Foot.
Pay Item No. 510-DSD:	Pipe Trench Backfill, Ft. Width	
Pay Item No. 510-ESD:	Concrete Seal or Cradle, Dia. Pipe	
Pay Item No. 510-FSD:	Concrete Trench Cap, Ft. Width	Per Linear Foot.
Pay Item No. 510-GSD:	Concrete Cap and Encasement, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-HSD:	Cement Stabilized Backfill, Dia. Pipe	
Pay Item No. 510-AW Dia.:	Pipe, Dia Type (all depths), including excavation and backfill	Per Linear Foot

Pay Item No. 510-AWRJ Dia.:	Factory Restrained Joint Pipe, Dia., Class Ductile Iron, (all depths) including Excavation and Backfill	Per Linear Foot.
Pay Item No. 510-BW× Dia.:	Connecting New Service to Existing Private Service ( Dia. New Service to Dia. Private Service)	Per Each.
Pay Item No. 510-CW:	Pipe Excavation, Ft. Width	Per Linear Foot.
Pay Item No. 510-DW:	Pipe Trench Backfill, Ft. Width	Per Linear Foot.
Pay Item No. 510-EW:	Concrete Seal or Cradle, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-FW:	Concrete Trench Cap, Ft. Width	Per Linear Foot.
Pay Item No. 510-GW:	Concrete Cap and Encasement, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-HW:	Cement Stabilized Backfill, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-IW:× Dia.:	Pressure Taps, Dia. × Dia.	
Pay Item No. 510-JW: × Dia.:	Wet Connections, Dia. × Dia.	
Pay Item No. 510-KW:	Ductile Iron Fittings	
Pay Item No. 510-AWW:	Pipe, Dia Type (all depths), including Excavation and Backfill	
Pay Item No. 510- AWWRJ Dia.:	Factory Restrained Joint Pipe, Dia., Class ductile Iron, (all depths) including Excavation and Backfill	
Pay Item No. 510-BWW × Dia.:	Connecting New Service to Existing Private Service ( Pia. New Service to Dia. Private Service)	

Pay Item No. 510-CWW:	Pipe Excavation, Ft. Width	Per Linear Foot.
Pay Item No. 510-DWW:	Pipe Trench Backfill, Ft. Width	Per Linear Foot.
Pay Item No. 510-EWW:	Concrete Seal or Cradle, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-FWW:	Concrete Trench Cap, Ft. Width	Per Linear Foot.
Pay Item No. 510-GWW:	Concrete Cap and Encasement, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-HWW:	Cement Stabilized Backfill, Dia. Pipe	Per Linear Foot.
Pay Item No. 510-KWW:	Ductile Iron Fittings	Per Ton.
Pay Item No. 510-VIDEO	Video Inspection of Newly Installed Box Culverts and Storm  Drain Pipe	
Pay Item No. 510-JH	2-inch Jumper Hose	Per Linear Foot.

An "R" after the pay item indicates the use for reclaimed water.

An "SD" after the pay item indicates the use for storm drain.

A "W" after the pay item indicates the use for water.

A "WW" after the pay item indicates the use for wastewater.

Source: Rule No. R161-17.05, 5-31-2017.

# End

Applicable References:

Standard Specifications Manual: Item Nos. Ref: 102S, 210S, 402S, 403, 501S, 505S, 506, 507S, 509S, 593S, 601S, 604S

Standards Manual: Standard Detail Nos. 510S-1, (520 - series).

Design Criteria Manuals: Utilities Criteria Manual, Section 5.

Item No. 511S Water Valves

# 511S.1 Description

This item shall govern the valves furnished and installed as indicated on the Drawings. Unless otherwise indicated on the Drawings, all valves 4 inches (102 mm) and larger shall be AWWA-type valves of suitable design and fully equipped for service buried in the earth, without need for further modification and shall be wrapped with 8-mil (0.2 mm) polyethylene film with all edges and laps securely taped to provide a continuous wrap. For reclaimed water piping, the polyethylene film shall be purple. Where not indicated, the Contractor may use valves with any type end-joint allowed for fittings of the pipe class being used. Unless otherwise indicated on the Drawings, all valve stems shall be adjusted to situate the operating nut not more than 24 inches (0.6 meters) below the proposed ground or paving surface of the finished project. Laydown valves shall not be used unless indicated otherwise on the Drawings by call out. Standard details shall not be an indicator of options.

This specification is applicable for projects or work involving either inch-pounds or SI units. Within the text, inch-pound units are given preference followed by SI units shown within parentheses.

#### 511S.2 Materials

The Contractor shall submit descriptive information and evidence that the materials and equipment the Contractor proposes for incorporation in the Work is of the kind and quality that satisfies the specified functions and quality. The City of Austin Water and Wastewater Utility Standard Products Lists (SPL) are considered to form a part of these Specifications. Contractors may, when appropriate, elect to use products from the SPL; however, submittal to the Engineer/Architect (E/A) is still required. If the Contractor elects to use any materials from these lists, each product shall be completely and clearly identified by its corresponding SPL number when making the product submittal. This will expedite the review process in which the E/A, and, if necessary, the Water and Wastewater Utility Standard Products Committee, decide whether the products meet the Contract requirements and the specific use foreseen by the E/A in the design of this engineered Project.

The SPL's should not be interpreted as being a pre-approved list of products necessarily meeting the requirements for a given construction Project. Items contained in the SPL cannot be substituted for items shown on the Drawings, or called for in the specifications, or specified in the Bidding Requirements, Contract Forms and Conditions of Contract, unless approved by the E/A in conjunction with the Water and Wastewater Utility Standard Products Committee. The Standard Product List current at the time of plan approval will govern.

A) Samples, Inspection and Testing Requirements:

All tests and inspections called for by the applicable standards shall be performed by the manufacturer. Upon request, results of these tests shall be made available to the purchaser.

B) Other Requirements:

Each submittal shall be accompanied by:

- 1) Complete data covering:
  - a). the operator, including type and size, model number, etc.,
  - b). the name and address of the manufacturer's nearest service facility,

- c). the number of turns to fully open or close the valve.
- 2) Detailed instructions for calibrating the limit stops for open and closed positions, and
- 3) Any other information that may be necessary to operate and maintain the operator.
- 4) Complete dimensional data and installation instructions for the valve assembly as it is to be installed, including the operator.
- 5) Complete replacement parts lists and drawings, identifying every part for both the valve and operator.

#### 511S.3 Valves

A) Iron-Body Gate Valves

Resilient-seated gate valves for potable or reclaimed service, including tapping valves, shall conform to AWWA C-509 and Standard Products List item WW-282.

Reduced-wall, resilient-seated gate valves for potable or reclaimed service, including tapping valves, shall conform to AWWA C-515 and Standard Products List item WW-700,

Metal-seated gate valves for potable or reclaimed service, including tapping valves, shall conform to AWWA C-500 and Standard Products List item WW-132.

- 1) Stem Seals: All valves shall have approved O-ring type stem seals. At least two O-rings shall be in contact with the valve stem where it penetrates the valve body.
- 2) Operation: All valves shall have non-rising stems with a 2" (50 mm) square operating nut, or with a spoke type handwheel when so ordered, turning clockwise to close.
- 3) Gearing: Gate valves in 24 inch (610 mm) and larger sizes shall be geared and, when necessary for proper bury depth and cover, shall be the horizontal bevel-geared type enclosed in a lubricated gear case.
- 4) Bypass: Unless otherwise indicated on the Drawings, 16 inch (406 mm) and larger metal-seated gate valves shall be equipped with a bypass of the non-rising stem type which meets the same AWWA standard required for the main valve.
- 5) Valve Ends: Valve ends shall be push-on, flanged or mechanical joint, as indicated or approved.
  - Tapping valves shall have inlet flanges conforming to MSS SP-60, with boltholes drilled per ANSI B16.1 Class 125. Seat rings and body casting shall be over-sized as required to accommodate full size cutters; the outlet end shall be constructed and drilled to allow the drilling machine adapter to be attached directly to the valve.
- 6) Gear Case: All geared valves shall have enclosed gear cases of the extended type, attached to the valve bonnet in a manner that makes it possible to replace the stem seal without disassembly and without disturbing the gears, bearing or gear lubricant. Gear cases shall be designed and fabricated with an opening to atmosphere so that leakage past the stem seal does not enter the gear case.
- 7) Valve Body: Double disc gate valves in 16 inch (406 mm) and larger sizes installed in the horizontal position shall have bronze rollers, tracks, scrapers, etc. For reclaimed water valves, the body shall be manufactured in purple, factory painted purple, or field painted purple.

# B) Butterfly Valves:

Unless otherwise indicated, all valves shall conform to the current "AWWA" Standard C-504, "Rubber-Seated Butterfly Valves", Class 150B, except as modified or supplemented herein.

#### 1) Functional Requirements

- a). Valves shall be the short body design and shall have flanged connections on both ends unless otherwise called for.
- b). Valves shall be of such design that the valve discs will not vibrate or flutter when operated in a throttled position. Valve discs shall be secured to the shafts by means of keys or pins so arranged that the valve discs can be readily removed without damage thereto. All keys and pins used in securing valve discs to shafts shall be stainless steel or monel. Valve discs shall be stainless steel or ductile iron, ASTM A 536, Grade 65-45-12 (448-310-12); seating edge shall be stainless steel or other corrosion resistant material.
- c). Valve shafts shall be constructed of wrought stainless steel or monel. The ends of the shaft shall be permanently marked to indicate the position of the disc on the shaft.
- d). All buried valves shall have approved manufacturer's O-ring type or split V type "Chevron" shaft seals. When O-ring seals are used, there shall be at least two O-rings in contact with the valve shaft where it penetrates the valve body.

On 24 inch (635 mm) and larger valves, the seat shall be completely replaceable and/or adjustable with common hand tools without disassembling the valve from the pipeline.

Rubber seats located on the valve disc shall be mechanically secured with stainless steel retainer rings and fasteners.

- e). Unless otherwise indicated, valves shall be provided with manual operators with vertical stems and 2 inches (50 mm) square operating nut turning clockwise to close and equipped with a valve disc position indicator. All keys or pins shall be stainless steel or monel. Buried valves shall have the valve stems extended or adjusted to locate the top of the operating nut no more than 24 inches (0.6 meter) below finish grade.
- f). Unless otherwise indicated, motorized butterfly valves shall be equipped with 230/460 volt, 3-phase reversing motor operators, extended as required to locate the center line of the operator shaft approximately 4 feet to 4 feet, 6 inches (1.2 to 1.4 meters) above finish grade. Operators shall be equipped with cast iron or malleable iron manual override hand wheel with a valve position indicator, local push button controls, lighted status/position indicator, torque and travel limit switches and all switches, relays and controls (except external power and signal wiring) necessary for both local and remote operation.

## 2) Performance Requirements

- a). Unless otherwise indicated, valve operators shall be sized to seat, unseat, open and close the valve with 150 psi (1 megapascal) shutoff pressure differential across the disk and allow a flow velocity of 16 feet (4.9 meters) per second past the disc in either direction.
- b). Motorized valve motors shall be capable of producing at least 140 percent of the torque required to operate the valves under conditions of maximum non-shock shutoff pressure without exceeding a permissible temperature rise of 131°F over

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104°F ambient (55 degrees Celsius over 40 degrees Celsius ambient); they shall have a duty rating of not less than 15 minutes and shall be capable of operating the valve through 4 1/2 cycles against full unbalanced pressure without exceeding the permissible temperature rise. Motors shall be suitable for operating the valve under maximum differential pressure when voltage to motor terminals is 80 percent of nominal voltage. Motor bearings shall be permanently lubricated and sealed.

#### C) Ball Valves:

Ball valves shall be brass, bronze, stainless steel or PVC as indicated on the Drawings or Details or as approved by the Engineer or designated representative.

#### D) Air-Vacuum Release Valves

1) Valves shall be combination air-release, air-vacuum units having small and large orifice units contained and operating within a single body or assembled unit.

The small orifice system shall automatically release small volumes of air while the pipe is operating under normal conditions. The large air-vacuum orifice system shall automatically exhaust large volumes of air while the pipe is being filled and shall permit immediate re-entry of air while being drained.

Valves shall be rated for at least 150 psi (1 megapascal) {maximum} normal service pressure.

## 2) Material Requirements

Valve exterior bodies and covers shall be cast iron or reinforced nylon.

Internal bushings, hinge pins, float guide and retaining screws, pins, etc., shall be stainless steel, bronze, nylon or Buna-N rubber.

Orifice seats shall be Buna-N rubber.

Floats shall be stainless steel, nylon or Buna-N rubber, rated at 1000 psi (6.9 megapascals).

Unless otherwise indicated, these valves shall be as included in the Standard Products List (SPL WW-367 for water, WW-462 for wastewater force mains).

## E) Fire Hydrants

All fire hydrants shall be Dry Barrel, Traffic Model (break-away), Post Type having Compression Type Main Valves with 5 1/4" (133 mm) opening, closing with line pressure. Approved models are listed on SPL WW-3 of the Water and Wastewater Utility Standard Products List.

#### 1) Applicable Specifications

AWWA C-502 current: "AWWA Standard for Dry-Barrel Fire Hydrants".

NFPA 1963: "National (American) Standard Fire Hose Coupling Screw Thread" and City of Austin 4 inch (102 mm) Fire Hose Connection Standard (Available upon request from the Austin Water Utility's Standards Committee Chairperson at 972-0204).

ANSI A-21.11 current: "American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings".

#### Functional Requirements

Design Working Pressure shall be 200 psi (1.38 megapascals) and a test pressure of 400 psi (2.76 megapascals).

Inlet shall be side connection hub end for mechanical joint (ANSI A-21.11-current). Shoe shall be rigidly designed to prevent breakage.

Lower Barrel shall be rigid to assure above ground break at traffic feature. Bury length of hydrant shall be four (4) feet (1.2 meters) minimum, five (5) feet (1.5 meters) maximum (hydrant lead pipe may be elbowed up from main using restrained joints; flanged joints in lead pipes are not allowed). Flange type connections between hydrant shoe, barrel sections and bonnet shall have minimum of 6 corrosion resistant bolts.

Hydrant Main Valve shall be 5 1/4 inch (133 mm) I.D. Valve stem design shall meet requirements of AWWA C502, with Operating Nut turning clockwise to close. Operating Nut shall be pentagonal, 1 1/2 inch (38 mm) point to flat at base, and 1 7/16 inches (36.5 mm) at top and 1 inch (25 mm) minimum height. Seat ring shall be bronze (bronze to bronze threading), and shall be removable with lightweight stem wrench. Valve mechanisms shall be flushed with each operation of valve; there shall be a minimum of two (2) drain ports.

Traffic Feature shall have replaceable breakaway ferrous metal stem coupling held to stem by readily removable type 302 or 304 stainless steel fastenings. Breakaway flange or frangible lugs shall be designed to assure aboveground break. Breakaway or frangible bolts will not be acceptable.

Outlet Nozzles shall be located approximately 18 inches (450 mm) above ground. Each hydrant shall have two (2) 2 1/2 inch (63.5 mm) nozzles 180 degrees apart with National (American) Standard Fire Hose Coupling Screw Thread NFPA 1963 and one (1) 4 inch (102 mm) pumper nozzle with City of Austin standard thread—six (6) threads per inch (25 mm) "Higbee" cut, 4.8590 inch (123.4 mm) O.D., 4.6425 inch (117.9 mm) root diameter. Nozzles shall be threaded or cam-locked, O-ring sealed, and shall have type 302 or 304 stainless steel locking devices. Nozzle caps (without chains) and cap gaskets shall be furnished on the hydrant. The cap nut shall have the same configuration as the operating nut.

Hydrants shall be Dry-Top Construction, factory lubricated oil or grease with the lubricant plug readily accessible. The system shall be described for City approval.

A blue Type II-B-B reflectorized pavement marker, conforming to Standard Specification Item No. 863S, shall be placed 2 to 3 feet (0.6 to 0.9 meters) offset from the centerline of paved streets, on the side of and in line with, all newly installed fire hydrants.

Hydrant shall have double O-ring seals in a bronze stem sheath housing to assure separation of lubricant from water and shall have a weather cap or seal, or both, as approved by the Owner, to provide complete weather protection.

## 3) Material Requirements

All below ground bolts shall be corrosion resistant. The hydrant valve shall be Neoprene, 90-durometer minimum. The seat ring, drain ring, operating nut and nozzles shall be bronze, AWWA C-502 current, containing not over 16 percent zinc. Break-away stem coupling shall be of ferrous material; its retaining pins, bolts, nuts, etc. of type 302 or 304 stainless steel.

Coatings shall be durable and applied to clean surfaces. Exterior surfaces above ground shall receive a coating of the type and color specified in the applicable version of City of Austin SPL WW-3. The coating shall be applied according to coating manufacturer's

specifications. Other exposed ferrous metal shall receive asphalt-based varnish, or approved equal, applied according to the coating manufacturer's specifications.

## F) Pressure/Flow Control Valves:

All control valves to regulate pressure, flow, etc., in City lines shall be models listed in the City of Austin Water and Wastewater Standard Products List (SPL).

## G) Drain Valves:

Drain valve materials and installation shall conform to City of Austin Standard Detail No. 511S-9A.

#### H) Valve Stem Extensions:

Valve stem extensions shall consist of a single piece of the required length with a socket on one end and a nut on the other.

## 511S.4 Construction Methods

# A) Setting Valves, Drains and Air Releases

Unless otherwise indicated, main line valves, drain valves and piping, air and vacuum release assemblies and other miscellaneous accessories shall be set and jointed in the manner described for cleaning, laying, and jointing pipe.

Unless otherwise indicated, valves shall be set at the locations shown on the Drawings and such that their location does not confict with other appurtenances such as curb ramps. Valves shall be installed so that the tops of operating stems will be at the proper elevation required for the piping at the location indicated above. Valve boxes and valve stem casings shall be firmly supported and maintained, centered and aligned plumb over the valve or operating stem, with the top of the box or casing installed flush with the finished ground or pavement in existing streets, and installed with the top of the box or casing approximately 6 inches (150 mm) below the standard street subgrade in streets which are excavated for paving construction or where such excavation is scheduled or elsewhere as directed by the Engineer or designated representative.

Drainage branches or air blowoffs shall not be connected to any sanitary sewer or submerged in any stream or be installed in any other manner that will permit back siphonage into the distribution system (see City of Austin "Standard Detail Drawings- Series 500/500S"). Every drain line and every air release line shall have a full sized independent gate valve flanged directly to the main. Flap-valves, shear gates, etc., will not be accepted.

# B) Setting Fire Hydrants:

Fire hydrants shall be located in a manner to provide accessibility and in such a manner that the possibility of damage from vehicles or conflict with pedestrian travel\_will be minimized. Unless otherwise directed, the setting of any hydrant shall conform to the following:

Hydrants between curb and sidewalk on public streets shall be installed as shown on Standard 511S-17, with outermost point of large nozzle cap 6" to 18" (150 mm to 450 mm) behind back of curb. Where walk abuts curb, and in other public areas or in commercial areas, dimension from gutter face of curb to outermost part of any nozzle cap shall be not less than 3 feet (0.9 meters), nor more than 6 feet (1.8 meters), except that no part of a hydrant or its nozzle caps shall be within 6 inches (150 mm) of any sidewalk or pedestrian ramp. Any fire hydrant placed near a street corner shall be no less than 20 feet (6 meters) from the curb line

point of tangency. Fire hydrants shall not be installed within nine feet (2.75 meters) vertically or horizontally of any sanitary sewer line regardless of construction.

All hydrants shall stand plumb; those near curbs shall have the 4-inch (102 mm) nozzle facing the curb and perpendicular to it. The hydrant bury mark shall be located at ground or other finish grade; nozzles of all new hydrants shall be approximately 18 inches (450 mm) above grade. Lower barrel length shall not exceed 5 feet (1.5 meters). Barrel extensions are not permitted unless approved by the Engineer or designated representative. Each hydrant shall be connected to the main by 6-inch (152 mm) ductile iron pipe; a 6-inch (152 mm) gate valve shall be installed in the line for individual shutoff of each new hydrant.

Below each hydrant, a drainage pit 2 feet (0.6 meter) in diameter and 2 feet (0.6 meter) deep shall be excavated and filled with compacted coarse gravel or broken stone mixed with coarse sand under and around the bowl of the hydrant, except where thrust blocking is located (City of Austin Specification Item 510 and Standard Detail 510-6 and to a level 6 inches (150 mm) above the hydrant drain opening.

The hydrant drainage pit shall not be connected to a sanitary sewer. The drain gravel shall be covered with filter fabric to prevent blockage of voids in the gravel by migration of backfill material. The bowl of each hydrant shall be well braced against unexcavated earth at the end of the trench with concrete thrust blocking (taking care not to obstruct the hydrant drain holes), or the hydrant shall be tied to the pipe with approved metal harness rods and clamps. The fire line shall be provided with joint restraint from the main line to the fire hydrant. Hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

Fire hydrants on mains under construction shall be securely wrapped with a poly wrap bag or envelope taped into place. When the mains are accepted and placed in service the bag shall be removed.

C) Pressure Taps: Refer to Section 510.3 (24) of Standard Specification Item Number 510, "Pipe".

## D) Plugging Dead Ends

Standard plugs shall be inserted into the bells of all dead ends of pipes, tees or crosses and spigot ends shall be capped. All end plugs or caps shall be secured to the pipe conforming to Section 510.3 (22) of Standard Specification Item Number 510, "Pipe".

## E) Protective Covering:

Unless otherwise indicated, all flanges, nuts, bolts, threaded outlets and all other steel component shall be coal tar coated and shall be wrapped with standard minimum 8-mil (0.2 mm) low density polyethylene film or a minimum 4-mil (0.1 mm) cross laminated high-density polyethylene meeting ANSI/AWWA Specification C-105-current, with all edges and laps taped securely to provide a continuous and watertight wrap. Repair all punctures of the polyethylene, including those caused in the placement of bedding aggregates, with duct tape to restore the continuous protective wrap before backfilling. For reclaimed water piping, the polyethylene shall be purple.

# F) Valve Box, Casing and Cover:

Stems of all buried valves shall be protected by valve box assemblies. Valve box castings shall conform to ASTM A 48, Class 30B. Testing shall be verified by the manufacturer at the time of shipment. Each casting shall have cast upon it a distinct mark identifying the manufacturer and the country of origin. Valve boxes and covers for potable water shall be round. Valve boxes and covers for reclaimed water piping shall be square and shall have "Reclaimed Water" indicated on the lid.

G) Drain Valve Installations:

Refer to City of Austin Standards 511S-9A.

H) Air Release Assemblies:

Refer to City of Austin Standards 511S-1A, 511S-1B, 511S-2A, 511S-2B, 511S-3A and 511S-3B.

I) Pressure/Flow Control Valves:

Assemblies shall be installed as indicated.

J) Connections to Existing System:

Refer to Item No. 510, "Pipe" for connections to the existing system.

K) Shutoffs:

Refer to Item No. 510, "Pipe" for shutoffs.

#### 511S.5 Measurement

All types of valves will be measured per each. Fire hydrants and drain valve assemblies will be measured per each. Fire Hydrant barrel extensions will be measured per vertical foot (meter: 1 meter equals 3.28 feet). Pressure/Flow control valve assemblies and both manual and automatic air release assemblies will be measured per each. Reflectorized pavement markers for identifying the location of newly installed fire hydrants shall be measured per each, as per Standard Specification Item No. 863S.7.

Bury depths exceeding 5.5 feet (1.68 meters) are defined as Additional Bury Depths. Additional bury depths will only be measured if indicated on the Drawings and identified in the Standard Contract Bid Form 00300U; otherwise, the unit bid price for each completed unit includes all depths.

#### 511S.6 Payment

Payment shall include full compensation, in accordance with the pay item established in the bid, for excavation, furnishing, hauling and placing valves, drain valve assemblies, fire hydrants and barrel extensions including anchorage and all incidental materials and work; preparing, shaping, dewatering, bedding, placing and compacting backfill materials and for all other incidentals necessary to complete the installation, as indicated in the Drawings, complete in place.

Payment for iron fittings and for wet connections is covered in Section 510.6 of Standard Specification Item 510, "Pipe".

Payment for excavation safety systems is covered in Section 509S.10 of Standard Specification Item 509S, Excavation Safety Systems.

- A) Valves: Valves will be paid for at the unit bid price for the size and type valve installed, including valve stem casing and cover, excavation and backfill, setting, adjusting to grade, anchoring in place, and other appurtenances necessary for proper operation.
- B) Fire Hydrants: Fire Hydrants installation shall be paid for at the unit bid price, which includes all necessary labor and materials to set, adjust to grade and anchor the hydrant body, barrel extensions, concrete block, gravel drain, and other appurtenances necessary for proper operation; but shall not include pipe and valve between the main line and fire hydrant base.
- C) Pressure or Flow Control Valve Assemblies: Pressure control and flow control valve assemblies will be paid for at the unit bid price, including box or vault, setting, adjusting to grade, anchoring in place,

- adjusting the control device to the required conditions, providing other appurtenances necessary for proper operation, and placing in operation.
- D) Drain Valve Assemblies: Drain valve installation shall be paid for at the unit bid price, which includes all necessary labor and materials to set, adjust to grade and anchor the bends, vertical piping, blind flange, joint restraint devices, concrete blocking, concrete pad, and other appurtenances necessary for proper operation; but shall not include pipe and valve between the main line and drain valve buried bend.
- E) Manual Air Release Assemblies: Manual air release installations will be paid for at the unit bid price and shall include valves, fittings, pipe, tapping the main, box and cover, and other appurtenances necessary for proper operation.
- F) Automatic Combination Air/Vacuum Release Valve Assembly: Automatic air-vacuum release assemblies will be paid for at the unit bid price and will include the main line tap or outlet, all pipe, valves, fittings, box or vault and cover, and other appurtenances necessary for proper operation.
  - G) Additional Bury Depth: Additional bury depth will be paid for at the unit bid price, which will include all work necessary to install units with bury depths exceeding 5.5 feet (1.68 meters).
- H) Fire Hydrant Barrel Extensions: Hydrant barrel extensions will be paid for at the unit bid price which will include necessary hardware and rod extensions.
- Reflectorized Pavement Markers: Pavement markers will be paid for at the unit bid price, which will include necessary surface preparation and adhesive, as per Standard Specification Item No. 863S.8.

Payment, when included as a contract pay item, will be made under one of the following:

Pay Item No. 511S-A:	Valves, Type,Diameter	Per Each.
Pay Item No. 511S-B:	Fire Hydrants (See Standard No. 511S-17)	Per Each.
Pay Item No. 511S- C:	Pressure or Flow Control Valve Assemblies	Per Each.
Pay Item No. 511S- D:	Drain Valve Assemblies (See Standard No. 511S-9A)	Per Each.
Pay Item No. 511S- E:	Manual Air Release Assemblies,Diameter	Per Each.
Pay Item No. 511S- F:	Automatic Combination Air/Vacuum Release Valve Assembly,	
	Diameter.	Per Each.
Pay Item No. 511S- G:	Additional Bury Depth	Per Vertical Foot.
Pav Item No. 511S-H:	Fire Hydrant Barrel Extensions	Per Vertical Foot

#### **END**

# **SPECIFIC** CROSS REFERENCE MATERIALS

Specification 511S, "Water Valves"

City of Austin Standard Specification Items

<u>Designation</u> <u>Description</u> Item No. 510 Pipe

Section-510.3 (22) Pipe Anchorage, Support and Protection

Section-510.3(24) Water System Connections

# City of Austin Standard Details

<u>Designation</u>	<u>Description</u>
511S-1A	25 mm (1") – 76 mm (2") Vented Air Release Valve Installation (Type I)
511S-1B	25 mm (1") - 76 mm (2") Non-Vented Air Release Valve Installation (Type I)
511S-2A	Type II - 76 mm (3") or Larger Vented Air/Vacuum Valve Installation

511S-2B	Type II - 76 mm (3") or Larger Non-Vented Air/Vacuum Valve Installation
511S-3A	Type III - 76mm (3") or Larger Vented Air/Vacuum Valve Installation
511S-3B	Type III-76mm (3") or Larger Non-Vented Air/Vacuum Valve Installation
511S-9A	Drain Valve Assembly
511S-17	Standard Fire Hydrant Installation

# SPECIFIC CROSS REFERENCE MATERIALS (Continued) Specification 511S, "Water Valves"

# City of Austin W/WW Standard Products

<u>Designation</u>	<u>Description</u>
WW-3	Standard Products List for Fire Hydrants
WW-132	Standard Products List for Metal-Seated Gate Valves, AWWA C-500
WW-282	Standard Products List for Resilient-Seated Gate Valves, AWWA C-509
WW-367	Standard Products List for Air Release Valves for Water
WW-462	Standard Products List for Air Release/Vacuum Relief Valves for Wastewater
WW-700	Standard Products List for Resilient-Seated Gate Valves, AWWA C-515

# ANSI/AWWA Standards

<u>Designation</u>	<u>Description</u>
A-21.11	American National Standard for Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings
C-105	American National Standard for Polyethylene Encasement for Ductile-Iron Pipe
C-500	Metal-Seated Gate Valves for Water Supply Service
C-502	Dry-Barrel Fire Hydrants
C-504	Rubber-Seated Butterfly Valves
C-509	Resilient Seated Gate Valves for Water and Sewerage Systems
C-515	Reduced-Wall, Resilient-Seated Gate Valves For Water Supply Service
A CTM Ctaradanda	

## ASTM Standards

<u>Designation</u> <u>Description</u>

ASTM A48/A48M Specification for Gray Iron Castings ASTM A 536 Specification for Ductile Iron Castings

# National Fire Protection Association (NFPA)

1963 National (American) Standard Fire Hose Coupling Screw Thread

# **RELATED** CROSS REFERENCE MATERIALS

Specification 511S, "Water Valves"

## City of Austin Standard Specification Items

<u>Designation</u>	<u>Description</u>
Item No. 501S	Jacking or Boring Pipe
Item No. 503S	Frames, Grates, Rings and Covers
Item No. 505S	Concrete Encasement and Encasement Pipe
Item No. 506S	Manholes
Item No. 507S	Bulkheads
Item No. 508S	Miscellaneous Structures and Appurtenances
Item No. 509S	Excavation Safety Systems

Previous Versions: 11/15/99 and

04/17/86

Item No. 602S Sodding for Erosion Control

# **602S.1 Description**

This item shall govern planting of Bermuda grass; St. Augustine or other acceptable grass sod at locations indicated on the Drawings or as directed by the Engineer or designated representative in accordance with this Standard Specification Item.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 602S.2 Submittals

The submittal requirements for this specification item shall include the identification of the type and source of sodding, the type of mulch, type of tacking agent and type and rate of application of fertilizer.

#### 602S.3 Materials

#### A. Block and Mulch Sod

The sod shall consist of live, growing Bermuda Grass, St. Augustine grass, when shown on the Drawings, or other acceptable grass sod indicated on the Drawings secured from sources that are approved by the Engineer or designated representative. Bermuda Grass sod, St. Augustine sod or other grass sod as shown on the Drawings shall have a healthy, virile root system of dense, thickly matted roots throughout the soil of the sod for a minimum thickness of 1 inch (25 millimeters). The thickness measure does not include grass. The sod shall be cut in rectangular pieces with its shortest side not less than 12 inches (300 mm). The Contractor shall not use sod from areas where the grass is thinned out nor where the grass roots have been dried out by exposure to the air and sun to such an extent as to damage its ability to grow when transplanted.

The sod shall be substantially free from noxious weeds, Johnson grass or other grasses and shall not contain any matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted. Unless the area has been closely pastured, it shall be closely mowed and raked to remove all weeds and long standing stems. Sources from which sod is to be secured shall be approved by the Engineer or designated representative.

Care shall be taken at all times to retain the native soil of the roots of the sod during the process of excavating, hauling and planting. Sod material shall be kept moist from the time it is dug until it is planted. The sod existing at the source shall be watered to the extent required by the Engineer or designated representative prior to excavating.

# B. Fertilizer

Previous Versions: 11/15/99 and 04/17/86

Fertilizer and the rate of application shall conform to the requirements of Standard Specification Item No. 606S, "Fertilizer".

#### C. Mulch

Straw mulch shall be oat, wheat or rice straw. Hay mulch may be substituted for straw mulch and shall be Prairie Grass; Bermuda grass or other hay approved by the Engineer or designated representative. The hay or straw mulch shall be free of Johnson grass or other noxious weeds and foreign materials. It shall be kept in a dry condition and shall not be molded or rotted.

#### D. Water

Water shall be furnished by the Contractor and shall be clean and free of industrial wastes and other substances harmful to the growth of sod or to the area irrigated.

#### E. Tacking Agents

Tacking agents for straw or hay mulch shall be as shown on the Drawings.

# 602S.4 Planting Season

All planting shall be done between April and November except as specifically authorized in writing by the Engineer or designated representative.

#### 602S.5 Construction Methods

# A. General

After the designated areas have been completed to the lines, grade and cross sections indicated on the Drawings, the surface shall be worked to a depth of not less than 4 inches (100 mm) with a disc, tiller or other equipment approved by the Engineer or designated representative. Fertilizer nutrients shall be applied and tilled. Areas that become crusted shall be reworked to an acceptable condition before sodding. Sodding of the type specified shall conform to the requirements of this Specification Item. The Contractor shall give continuous care to the sodded area until the sod is accepted.

#### B. Placement

The sod shall be placed on the prepared surface with the edges in close contact and alternate courses staggered. In ditches the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the longer dimension parallel to the contours of the ground. The exposed edges of sod shall be buried flush with the adjacent soil. On slopes exceeding 3:1 or where the sod may be displaced, the sod shall be pegged with not less than 4 stakes or ground\_staples per square yard (square meter) with at least 1 stake or ground staple for each piece of sod.

Pegs shall be of wood lath or similar material, pointed and driven with the flat side against the slope, 6 inches (150 mm) into the ground, leaving approximately 1/2 inch (12.5 mm) of the top above the ground. Ground staples shall not be less than

Previous Versions: 11/15/99 and 04/17/86

13 inches (330 mm) in length and shall be constructed of No. 11 gage (3 mm) wire that is bent to form a "U" approximately 1 inch (25 mm) in width.

# C. Watering

Immediately after the area is sodded, it shall be watered with a minimum of 5 gallons of water per square yard (22.5 liters per square meter) and at 10 day intervals as needed and as directed by the Engineer or designated representative. Subsequent to the initial application water shall be applied at a minimum rate of 3 gallons per square yard (13.5 liters per square meter), as required on the Drawings or as directed by the Engineer or designated representative until final acceptance by the City or until the grass uniformly reaches a height of 2 1/2 inches (62.5 mm).

Availability of water from the Austin Water Utility will be limited as stated under the Water Conservation Standard, City of Austin Land Development Code Chapter 6-2, Article II, "Water Use Management Plan Established".

The use of potable water will be restricted as stated in City of Austin Land Development Code Sections 6-4-73, 6-4-54, 6-4-63, 6-4-64, 6-4-65, 6-4-81, 6-4-92, 15-9-37(D) and 15-9-101(B).

#### D. Finishing

Where applicable, the shoulders, slopes and ditches shall be smoothed after planting has been completed and shaped to conform to the desired cross sections shown on the Drawings. Any excess soil from planting operations shall be spread uniformly over adjacent areas or disposed of as directed by the Engineer or designated representative so that the completed surfaces will present a neat appearance. All sodded areas shall be rolled after the initial watering application, when sufficiently dry.

#### 602S.6 Block Sodding

At locations indicated on the Drawings or where directed by the Engineer or designated representative, sod blocks shall be carefully placed on the prepared areas. The fertilizer shall then be applied in accordance with the applicable provisions of Item No. 606S, "Fertilizer" and thoroughly watered. When sufficiently dry, the sodded area shall be rolled or tamped to form a thoroughly compacted, solid mat. Any voids left in the block sodding shall be filled with additional sod and tamped. Surfaces of block sod which, in the opinion of the Engineer or designated representative may slide due to the height and slope of the surface or nature of the soil, shall be pegged with wooden pegs driven through the sod blocks into firm earth sufficiently close to hold the block sod firmly in place. Edges along curbs and drives, walkways, etc., shall be carefully trimmed and maintained until the sodding is accepted.

# 602S.7 Mulch Sodding

The sod source shall be disked in 2 directions cutting the sod thoroughly to a depth of not less than 4 inches (100 mm). Sod material shall be excavated to a depth of not more than 2 inches (50 mm) below the existing root system, being careful to avoid having soil containing no grass roots. The disked sod may be windrowed or otherwise

Previous Versions: 11/15/99 and 04/17/86

handled in a manner satisfactory to the Engineer or designated representative. The material shall be rejected if not kept in a moist condition.

Prior to placement of mulch sod, the cut slopes shall be scarified by plowing furrows 4 inches (100 mm) to 6 inches (150 mm) deep along horizontal slope lines at 2 foot (600 mm) vertical intervals. Excavated material from the furrows shall not protrude more than 3 inches (75 mm) above the original surface of the cut. Fertilizer shall be distributed uniformly over the area in accordance with the applicable provisions of Item No. 606S, "Fertilizer". The sod shall then be deposited upon the prepared area and spread uniformly to the thickness indicated on the Drawings.

Any section that is not true to lines and cross sections shall be remedied by the addition of sod material or by reshaping the material to meet the requirements of "Finishing"[Section 602S.5 (4)]. After the sod material has been spread and shaped, it shall be thoroughly wetted and compacted with a corrugated roller of the "Cultipacker" type. All rolling of slope areas shall be on the contour.

#### 602S.8 Measurement

Work and acceptable material for "Sodding for Erosion Control" will be measured by the square yard (square meter: 1 square meter is equal to 1.196 square yards) complete in place with a minimum of 95 percent growth with a 2 1/2 inch (62.5 mm) stand of grass.

## 602S.9 Payment

The work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price for Bermuda Block Sodding", "St. Augustine Block Sodding", "Bermuda Mulch Sodding" or "Other Approved Grass Sodding". The prices shall each represent full compensation for completion of the work including all water applications, rolling, pegging and fertilizer as indicated on the Drawings.

Payment will be made under one of the following:

Pay Item No. 602S-A:Bermuda Block Sodding -Per Square Yard.Pay Item No. 602S-B:St. Augustine Block Sodding -Per Square Yard.Pay Item No. 602S-D:Bermuda Mulch Sodding -Per Square Yard.Pay Item No. 602S-D:Grass Sodding -Per Square Yard.

End

**SPECIFIC** CROSS REFERENCE MATERIALS

Specification 602S, "Sodding for Erosion Control"

City of Austin Land Development Code

<u>Designation</u> <u>Description</u>

Chapter 4-2, Article II Emergency and Peak Day Water Use Management

04/17/86

City of Austin Standard Specification Items

<u>Designation</u> <u>Description</u> Item No. 606S Fertilizer

City of Austin Land Development Code

Designation Description

Section 6-4-52 Water Use Management Plan Established

Section 6-4-53 Applicability

Section 6-4-54 Compliance Required

Section 6-4-63 Permanent Water Use Restrictions

Section 6-4-64 Water Conservation Stage One Regulations
Section 6-4-65 Water Conservation Stage Two Regulations

Section 6-4-81 Variance Section 6-4-92 Penalty

Section 15-9-37(D) Customer's Responsibilities
Section 15-9-101(B) Basis for Termination of Service

# **RELATED** CROSS REFERENCE MATERIALS

Specification 602S, "Sodding for Erosion Control"

# City of Austin Standard Specification Items

<u>Designation</u>	<u>Description</u>
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Item No. 110S Street Excavation

Item No. 111S Excavation

Item No. 120S Channel Excavation

Item No. 132S Embankment

Item No. 601S Salvaging and Placing Topsoil Item No. 604S Seeding for Erosion Control

Item No. 608S Planting

Item No. 610S Preservation of Trees and Other Vegetation

# Texas Department of Transportation: Standard Specifications for Construction and

# Maintenance of Highways, Streets, and Bridges

Designation	Description
Designation	DUSUIDIIOII

Item No. 100 Preparing Right of Way

Item No. 110 Excavation

Item No. 160 Furnishing and Placing Topsoil
Item No. 162 Sodding for Erosion Control
Item No. 164 Seeding for Erosion Control

Item No. 166 Fertilizer

Item No. 168 Vegetative Watering

Item No. 204 Sprinkling

Item No. 605S Soil Retention Blanket

#### 605S.1 Description

This item shall govern the provision and placement of wood, straw or coconut fiber mat, synthetic mat, paper mat, jute mesh or other material as a soil retention blanket for erosion control on slopes or ditches or short-term or long-term protection of seeded or sodded areas indicated on the Drawings or as specified by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, inch-pound units are given preference with SI units shown within parentheses.

#### 605S.2 Submittals

The submittal requirements for this specification item shall include the soil retention blanket material type and sample, evidence that the material is listed on TxDoT/TTI Approved Products List, one (1) full set of Manufacturer's literature and installation recommendations, and any special details necessary for the proposed application.

#### 605S.3 Materials

#### A. Soil Retention Blankets

All soil retention blankets must be listed on TxDoT Approved Products List or approved by the Engineer or designated representative.

The soil retention blanket shall be one (1) of the following classes and types as shown on the Drawings:

- 1. Class 1. "Slope Protection"
  - (a) Type A. Slopes 1:3 or flatter Clay soils
  - (b) Type B. Slopes 1:3 or flatter Sandy soils
  - (c) Type C Slopes steeper than 1:3 Clay soils
  - (d) Type D Slopes steeper than 1:3 Sandy soils
- 2. Class 2. "Flexible Channel Liner"
  - (a) Type E Short-term duration (Up to 2 years)
    Shear Stress (t<sub>d</sub>) < 1 pound per square foot [psf] (48 Pa)
  - (b) Type F Short-term duration (Up to 2 years) Shear Stress (t<sub>d</sub>) 1 to 2 psf (48 to 96 Pa)
  - (c) Type G Long-term duration (Longer than 2 years) Shear Stress ( $t_d$ ) >2 to <5 psf (>96 to <239 Pa)
  - (d) Type H Long-term duration (Longer than 2 years) Shear Stress ( $t_d$ )  $\geq 5$  psf ( $\geq 239$  Pa)

#### B. Fasteners

The fasteners shall conform to the recommendations of the manufacturer for the selected soil retention blanket.

605S 06/21/07 Page 1 Soil Retention

#### 605S.4 Construction Methods

#### A. General

The soil retention blanket shall conform to the class and type shown on the Drawings. The Contractor has the option of selecting an approved soil retention blanket conforming to the class and type shown on the Drawings which is included on the Approved Products List published by TxDoT/TTI Hydraulics and Erosion Control Laboratory.

#### B. Site Preparation:

Prior to placement of the soil retention blanket, the seedbed area to be covered shall be relatively free of all clods and rocks over 1 1/2 inches (37.5 mm) in maximum dimension and all sticks or other foreign matter that will prevent close contact of the preparation mat with the soil surface. The area shall be smooth and free of ruts and other depressions. If the prepared seedbed becomes crusted or eroded as a result of rain or if any eroded places, ruts or depressions exist for any reason, the Contractor shall be required to rework the soil until it is smooth and to reseed or resod the area at the Contractor's own expense. After the area has been properly prepared, the blanket shall be laid out flat, even and smooth, without stretching or crimping the material.

#### C. Installation

The Soil Retention Blanket, whether installed as slope protection or as flexible channel liner in accordance with the TxDoT/TTI Approved Products List, shall be placed within 24 hours after seeding (Standard Specification Item No. 604S), sodding (Standard Specification Item No. 602S) or native grassland seeding and planting (Standard Specification Item No. 609S) erosion control operations have been completed, or as approved by the Engineer or designated representative. The soil retention blanket shall be installed and anchored in accordance with the Manufacturer's recommendations. The Contractor shall contact the Engineer or designated representative three (3) days prior to the installation of the soil retention blanket to allow for inspection of the installation by City of Austin personnel.

## 605S.5 Measurement

This work and acceptable material for "Soil Retention Blanket" will be measured by the square yard (square meter: 1 square meter is equal to 1.196 square yards) of surface area covered, complete in place.

## 605S.6 Payment

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Soil Retention Blanket" of the class shown on the Drawings or approved by the Engineer or designated representative. The unit price shall include full compensation for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. Anchors, checks, terminal and wire staples will not be paid for directly, but will be included in the unit price bid for this specification item.

Payment will be made under the following:

Pay Item No. 605S-A: Soil Retention Blanket Class\_\_\_; Type \_\_\_- Per Square Yard.

#### **End**

# SPECIFIC CROSS REFERENCE MATERIALS Specification 605S, "Soil Retention Blanket"

## City of Austin Standard Specification Items

<u>Designation</u>	<u>Description</u>

Item No. 602S Sodding for Erosion Control Item No. 604S Seeding for Erosion Control

Item No. 609S Native Grassland Seeding and Planting for Erosion Control

# **RELATED** CROSS REFERENCE MATERIALS

# City of Austin Standard Specification Items

Designation I	Description
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Item No. 101S Preparing Right of Way Item No. 102S Clearing and Grubbing

Item No. 111S Excavation

Item No. 120S Channel Excavation

Item No. 132S Embankment Item No. 606S Fertilizer Item No. 608S Planting

Item No. 204

Item No. 610S Preservation of Trees and Other Vegetation

# <u>Texas Department of Transportation</u>: <u>Standard Specifications for Construction and</u>

# Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 100	Preparing Right of Way
Item No. 110	Excavation
Item No. 132	Embankment
Item No. 158	Specialized Excavation Work
Item No. 160	Furnishing and Placing Topsoil
Item No. 162	Sodding for Erosion Control
Item No. 164	Seeding for Erosion Control
Item No. 166	Fertilizer
Item No. 168	Vegetative Watering
Item No. 169	Soil Retention Blanket

Sprinkling

#### ITEM NO. 609S - NATIVE SEEDING AND PLANTING FOR RESTORATION 1-4-16

#### 609S.1 - Description

This item shall govern the preparation of a seeding and planting area to the lines and grades indicated on the Drawings. This may include seedbed preparation, sowing of seeds, planting of rooted plants, watering, hydromulch, compost and other management practices, as indicated in the Drawings or as directed by the Landscape Architect, Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, inch-pound units are given preference with SI units shown within parentheses.

Source: Rule No. R161-14.29, 12-30-2014.

#### 609S.2 - Submittals

The following submittal items are required in writing during construction:

- A. For seed, provide identification of the species, source, mixture, and pure live seed (PLS) of the seed as listed on each seed bag to be used. Copies of the analysis tags and certification tags from all seed bags shall be submitted.
- B. Type of mulch or compost.
- C. Watering frequency and amount as shown on an irrigation watering schedule.
- D. Type of management practices (e.g., hand-weeding, pesticide application, etc.) proposed, with a proposed schedule for observation and treatment.
- E. For hydromulch applications, the proposed application rate of seed, type of mulch and tacking agent, and other relevant information. An example of the required documentation is in Table 1.
- F. Type of hydraulic seeding equipment and nozzles proposed for use.
- G. If pesticide use is proposed, an IPM plan for pest control including pesticide label, proposed application rate and timing, and MSDS sheets.
- H. One gallon sample of proposed mulch or compost.
- I. The following submittal items are required before Substantial Completion:
  - A. For hydromulch applications, submit the complete hydromulch application log, including date, time and quantity of product units placed in the slurry tank. An example of an application log is in Table 2.
  - B. Pesticide and fertilizer application tracking log. As of January 1, 2012, documentation of all outdoor pesticide and fertilizer use on city-owned properties is required to demonstrate compliance with the EPA/TCEQ mandated Municipal Stormwater Permit, the TPDES General Pesticide Permit, City Code, and the IPM program.

Table 1: Example of proposed hydromulch application rates

Hydro	Sheet	Seed			Hydro Sl	r acre rates)		
Mix	No.	Mix	Acres	Seed (Bags/ac)	Tackifier (Buckets/ac)	Mulch (Bales/ac)	Fertilizer (Bags/ac)	Addl. Amendments

								(Bags/ac)
1	L2	А	1.0	1	100	1000	50	5
2	L3	А	0.5	2	200	1500	50	5
3	L5	В	3.0	3	300	3000	50	5

Table 2: Example of hydromulch application log

		Finis				Hydro Slurry Unit (per acre rates)					
Dat e	Start Time	h Time	ac/Tan k	Wate r (gal)		Seed (Bags/ac	Tackifier (Buckets/ac	Mulch (Bales/ac	Fertilizer (Bags/ac	Addl. Amendment s (Bags/ac)	
4/13	10:3 0	11:15	1.0	3300	А	1	100	1000	50	5	
4/17	2:00	2:30	0.5	3300	А	2	200	1500	50	5	
5/20	8:30	10:00	1.2	3300	В	3	300	3000	50	5	
					Total s	6	600	5500	127	15	

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

609S.3. - Materials

#### A. Seed.

All seed must meet the requirements of the Texas Seed Law including the labeling requirements for showing PLS, name and type of seed, and all other required elements of the Analysis and Certification Tags. The seed furnished shall be of the previous season's crop and the date of analysis shown on each bag shall be within 12 months of the time of delivery to the project. Each variety of seed shall be furnished and delivered in separate bags or containers, unless a specific mix is proposed for use. A sample of each variety of seed shall be furnished for analysis and testing when directed by the Landscape Architect, Engineer or designated representative.

The amount of seed planted per square yard (.84 square meters) or acre (hectare) shall be of the type specified in Section 609S.5.

- B. **Water.** Water shall be clean and free of industrial wastes and other substances harmful to the growth of plant materials in the area irrigated.
- C. **Topsoil.** Topsoil shall conform to Standard Specification Item No. 601S.3(A).
- D. **Pesticide.** A least toxic, integrated pest management (IPM) approach shall be used to control weeds. A written request for approval of weed control product(s) and/or materials shall be submitted to the City of Austin Watershed Protection Department (ERM) IPM program coordinator for approval. Additional information can be found at http://www.austintexas.gov/ipm.
- E. **Fertilizer.** If fertilizer used is deemed necessary, the fertilizer shall conform to Standard Specification Item No. 606S, Fertilizer. The type and rate of fertilizer should be based on chemical tests of recent (no older than 6 months before application) representative site soil samples. Fertilizer should be applied only when plants can take them up for growth, during: 1) seed germination and plant establishment and 2) after plant establishment. Fertilizer shall not be applied within 48 hours of a potential rain event.
- F. **Tackifier.** The tacking agent shall be a biodegradable material approved by the Landscape Architect, Engineer, or designated representative.
- G. **Mulch.** Mulch may be used to help prevent soil erosion until preferred plant establishment, whether the mulch be hydraulically applied or shredded vegetative matter. Hydromulching for temporary and permanent vegetation stabilization shall conform to Environmental Criteria Section 1.4.7.
- H. **Hydroseeding Equipment.** Hydroseeding equipment shall be clean and free of all previous seeds, fertilizer, mulch, or any hydroseeding products used on prior jobs.
- I. **Rooted Plants.** Where proposed, rooted plants shall conform to the requirements of Standard Specification 608S, Planting.

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

#### 609S.4 - Construction Methods

#### A. General.

The Contractor shall limit preparation to areas that will be seeded/planted immediately. All weedy species (Table 3) shall be controlled by application of an herbicide and/or by physical removal (by the roots) prior to, during the planting operation, and through establishment. The specified weedy species shall be maintained at ten (10) percent or less of total cover after seeding. Additionally, the Landscape Architect, Engineer, or qualified landscape professional may require removal of any plant species that appears to be out-competing seeded or planted species during construction or the establishment period.

Seeds and fruits of non-native woody invasive species should be separated from the rest of the removed plants before mulching or hauling off the material. It must be bagged and disposed of in a landfill to prevent unintentional reintroduction to the site or elsewhere.

Table 3: Weed List

Weed Type	Botanical Name	Common Name
Summer Annual Herb	Ambrosia spp.	Ragweed

Perennial Grass	Bothriochloa ischaemum	K.R. Bluestem	
Annual Grass	Cenchrus spp.	Sandbur	
Herb	Cnidoscolus texanus	Bull Nettle	
Perennial Grass	Sorghum halapense	Johnson Grass	
Perennial Grass	Arundo donax	Giant Cane	
Perennial Grass	Phllostachys aurea	Golden Bamboo	
Vine	Toxicodendron radicans	Poison Ivy	
Herb	Urtica spp.	Stinging Nettle	
Winter Annual Herb	Rapistrum rugosum	Bastard Cabbage	
Winter Annual Grass	Bromus arvensis	Japanese Brome	
Winter Annual Grass	Lolium multiflorum	Annual Ryegrass	
Tree	Triadica sebifera	Chinese Tallow	
Tree	Ligustrum sp.	Privet	
Tree	Melia azedarach	Chinaberry	
Tree	Lonicera japonica	Japanese Honeysuckle	
Shrub	Nandina domestica	Heavenly Bamboo	
Shrub	Photinia sp.	Photinia	

# B. Plant Bed Preparation.

After the designated seeding/planting areas have been rough graded, a suitable planting area shall be prepared. In areas where cut or fill is required, a minimum of 6 inches (150 mm) of topsoil (see Section 609S.3.C) shall be placed or use approved existing soil (that is not infested with invasive or noxious plant rootstock [e.g., *Arundo donax* rhizomes]) stockpiled over the entire planting area.

The topsoil or growing medium must be prepared so that compaction is appropriate for plant growth, and to achieve acceptable bulk density or hydrologic function. Ripper and subsoilers may be used to loosen compacted soil and roughen the surface. Disks, plows and excavator attachments are good for compaction reduction, roughening, and for incorporating amendments. If tracked machinery is used in seedbed preparation, cleat marks should run with the contour to prevent rills.

In areas with no soil disturbance, the weeds shall be eliminated and a minimum of 6 inches (150 mm) of topsoil, if none currently exists, shall be placed. The seedbed shall be prepared with limited irregularities, lumps or soil clods and the surface shall be raked or rolled to facilitate seed to soil contact.

Water shall be gently applied as required to prepare the seedbed before the planting operation either by broadcast seeding or hydraulic planting. Seeding shall be performed in accordance with the requirements hereinafter described.

## C. Watering.

All watering shall comply with City Code Chapter 6-4 (Water Conservation). Water the seeded/planted areas immediately after installation to achieve germination and a healthy stand of native plants that can ultimately survive without supplemental water.

Apply the water uniformly to the planted areas without causing displacement or erosion of the materials or soil.

Watering applications shall insure that the plantbed is maintained in a moist condition favorable for the growth of plant materials. Watering shall continue until minimum coverage is achieved and accepted by the Landscape Architect, Engineer or designated representative. Watering may be postponed immediately after a half-inch inch (12.5 mm) or greater rainfall on the site but shall be resumed before the soil dries out.

## D. Cool Season Cover Crop.

From September 15 to March 1, non-native and native seeding shall include a cool season cover crop at the rate specified in Tables 4, 5, or 6. Cool season cover crops are not permanent erosion control. If installed separately from the proposed seed mix, the cool season cover crops shall be moved to a height of less than one (1) inch after March 1, and the area shall be re-seeded at the specified seeding rate for native warm-season species (March 1 to September 15).

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

## 609S.5 - Native Seeding and Planting

Seeding and planting shall be performed in accordance with the requirements described below. The optimum depth for seeding shall be 1/4 inch (6 millimeters). Seed shall be applied by a method that achieves consistent distribution across a site and proper seed to soil contact (i.e. hand broadcasting, hydromulch, or drill method).

Rooted plants should be strategically and thoughtfully placed on a site. They need not be installed at a consistent, regular pattern across the plantable area(s) of a site but can be clustered or placed irregularly. The goal is to place the rooted plants where they will have the greatest or best effect or impact, and where there is sufficient space (e.g., root space, space off of utilities) and proper conditions (e.g., soil depth, moisture, light) for their long-term success. Installation of rooted plants shall comply with Standard Specification 608S, but rooted plants must not be spaced closer than three-feet (3') on center. Mulching around seed and rooted plants is not required, but it is a good technique for protecting plants during germination and establishment. Figure 609S.5-1 is an example of rooted plant layout on a hypothetical site.

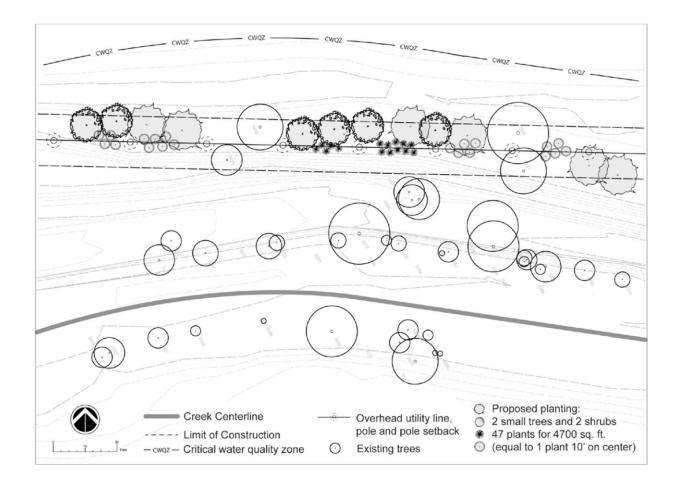


Figure 609S.5-1: Example of Rooted Plant Layout and Calculation

Rooted Plants such as trees, ornamentals, and shrubs are prohibited from being installed within fifteen (15) feet of any Austin Water Utility (AWU) infrastructure and/or within any easement dedicated for AWU infrastructure. Rooted plants such as grasses, succulents and/or ground cover are permitted within fifteen (15) of any AWU infrastructure and/or within any easement dedicated for AWU infrastructure.

Species substitution, when necessary due to availability, shall be approved by City of Austin representative including Environmental Reviewer, Environmental Inspector, or Watershed Protection Department representative. Only native or adapted species suitable for the designated environmental conditions shall be allowed as substitutes. Shorter growing natives such as Buffalograss should be sodded around manholes or other structures requiring higher visibility for access.

If the plant materials are being installed during the cool season (September 15 to March 1), a cool season cover crop species (as listed below) shall be included in the seed mix or installed separately.

The seed and rooted plant mixtures shall be applied in accordance with appropriate growing environments (Upland Full Sun-Table 4, Upland Shade-Dappled-Table 5 and Facultative Moderate to High Moisture-Table 6). Grasses shall constitute 67 percent of the seed mix, with forbs comprising 33 percent. No species shall constitute more than 20% of a seed mix.

**Table 4. Upland Species, Full Sun Areas** 

Type Common Botanical Recommended Rooted Plants Species, Diver	sity,
--	-------

	Name	Name	Application rate Ibs/ac (kg/ha)	Quantity & Size
	Buffalograss	Buchloe dactyloides	24.0 (27.0)	
	Blue Grama	Bouteloua gracilis	10.0 (11.2)	
	Green Sprangletop	Leptochloa dubia	2.0 (2.2)	
Grass Seed	Sand Dropseed	Sporobolus cryptandrus	1.0 (1.1)	A minimum of two (2) native species of small or large trees, and two (2) native
Mix**	Galleta	Pleuraphis jamesii	10.0 (11.2)	
	Canada Wild Rye	Elymus canadensis	10.0 (11.2)	species of shrubs with Very Low or Low (VL or L) water needs and Sun or Sun/Part Shade light needs as listed in
	Purple Threeawn	Aristida purpurea	4.0 (4.5)	the current Grow Green Native and Adapted Landscape Plants guidance document***. Plants must be a
	Sideoats Grama	Bouteloua curtipendula	7.0 (7.8)	minimum size of 1-gallon (see Table 8, equivalency chart) and minimum of 1 plant per 100 square feet.
	Bluebonnet	Lupinus texensis	20.0 (22.4)	
Forb	Purple Prairie Clover	Dalea purpurea	4.0 (4.5)	
Seed Mix**	Plains Coreopsis	Coreopsis tinctoria	2.0 (2.2)	
	Partridge Pea	Chamaecrista fasciculata	20.0 (22.4)	
	Greenthread	Thelesperma	6.0 (6.7)	

		filifolium		
	Indian Blanket	Gaillardia pulchella	10.0 (11.2)	
	Lemon Mint	Monarda citriodora	3.0 (3.4)	
	Mexican Hat	Ratibida columnaris	2.0 (2.2)	_
	Pink Evening Primrose	Oenethera speciosa	1.0 (1.1)	
	Sunflower (Common)	Helianthus annuus	5.0 (5.6)	_
	Milkweed (Antelope Horn or Green milkweed)	Asclepias asperula or Asclepias viridis	0.1 (0.04)	
			Total	
Tota	I recommended s	eed mix applicati	on rate is 35 lbs/ac	(23.5 lbs/ac grass, 11.5 lbs/ac forb
Cool	Cereal rye grain*	Secale cereale	34.0 (38.1)	
Season Cover	Oats*	Avena sativa	4.0 (4.5)	Add at least one of the cool seaso grasses to the warm-season mix between September 15 and Marc
Grasses	Western	Pascopyrum	5.6.(6.3)	1

5.6 (6.3)

Wheatgrass\*

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<sup>\*</sup> Plant only between. September 15 to March 1. Non-persistent winter cover crop for erosion control. Only one cool season species is required per installation.

<sup>\*\*</sup> Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by an authorized City of Austin representative including Environmental Reviewer, Environmental Inspector, or Watershed Protection Department representative. The total

pounds/acre (lbs/ac) of the proposed seed mix can be calculated based on the desired percentage of each seed in a mix.

\*\*\* www.austintexas.gov/department/grow-green/plant-guide

Table 5. Upland Species, Shade-Dappled Light Areas

Туре	Common Name	Botanical Name	Recommended Application rate Ibs/ac (kg/ha)	Rooted Plants Species, Diversity, Quantity & Size	
	Inland Seaoats**	Chasmanthium latifolium	12.0 (13.5)		
Grass Seed Mix***	Canada Wildrye	Elymus canadensis	10.0 (11.2)		
	Sideoats Grama	Bouteloua curtipendula	7.0 (7.8)		
	Purple Coneflower	Echinacea purpurea	10.0 (11.2)	A minimum of two (2) native species of small or large trees, and two (2)	
	Lanceleaf Coreopsis	Coreopsis lanceolata	10.0 (11.2)	native species of shrubs with very low (VL), low (L), or low-medium (L-M) water needs and Sun /Part Shade light	
	Scarlet Sage   Salvia coccinea   8.0 (9.0)	needs as listed in the current Grow Green Native and Adapted Landscape			
Forb	Drummond Phlox	Phlox drummondii	8.0 (9.0)	Plants guidance document****.  Plants must be a minimum size of 1- gallon (see Table 8, equivalency chart)	
Seed Mix*** Black-Eyed Susan Rudbeckia hirta 2.0 (2.	2.0 (2.2)	and minimum of 1 plant per 100 square feet.			
	Cutleaf Daisy  Engelmannia pinnatifida  18.0 (20.2)				
	Tall Aster	Aster praealtus	1.0 (1.1)		
	Illinois bundleflower	Desmanthus illinoensis	15.0 (16.8)		
	Standing cypress	Ipomopsis rubra	6.0 (6.7)		

	Winecup	Callirhoe involucrata	5 (5.6)	
	Milkweed (Butterfly Weed or Showy Milkweed)	Asclepias tuberosa or Asclepias speciosa	0.1 (0.04)	
Tota	l recommended se	ed mix application	Total rate is 35 lbs/ac (2	3.5 lbs/ac grass, 11.5 lbs/ac forbs).
Cool	Cereal rye grain***	Secale cereale	34.0 (38.1)	Add at least one of the cool season
Season Cover	Oats***	Avena sativa	4.0 (4.5)	grasses to the warm-season mix between September 15 and March 1.
Grasses	Western	Pascopyrum	5.6 (6.3)	

Wheatgrass\*\*\*

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Table 6. Facultative Species, Moderate - High Moisture Areas

Туре	Common Name	Botanical Name	Recommended Application rate Ibs/ac (kg/ha)	Rooted Plants Species, Diversity, Quantity & Size
Grass Seed	Big Bluestem	Andropogon gerardii	8.0 (9.0)	A minimum of two (2) native species of small or large trees, and two (2) native species of shrubs with low (L), low-
Mix**	Big Muhuly	Muhlenbergia	6.0 (6.7)	medium (L-M), or medium (M) water

<sup>\*\*</sup> If unavailable replace with Prairie Wild Rye.

<sup>\*\*\*</sup> Plant only between September 15 to March 1. Non-persistent winter cover crop for erosion control. Only one cool-season species is required per installation.

<sup>\*\*\*\*</sup> Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by an authorized City of Austin representative including Environmental Reviewer, Environmental Inspector, or Watershed Protection Department representative. The total pounds/acre (lbs/ac) of the proposed seed mix shall be calculated based on the desired percentage of each seed in a mix.

<sup>\*\*\*\*</sup> www.austintexas.gov/department/grow-green/plant-guide

	(Lindhiemers)	lindheimeri	
	Bushy Bluestem	Andropogon glomeratus	6.0 (6.7)
	Eastern Gamagrass	Tripsacum dactyloides	12.0 (13.5)
	Indiangrass	Sorghastrum nutans	6.0 (6.7)
	Inland Seaoats	Chasmanthium latifolium	12.0 (13.5)
	Canada Wildrye	Elymus canadensis	10.0 (11.2)
	Sand Lovegrass	Eragrostis trichodes	2.0 (2.2)
	Switchgrass	Panicum virgatum	4.0 (4.5)
	Black-Eyed Susan	Rudbeckia hirta	2.0 (2.2)
	Illinois Bundleflower	Desmanthus illinoensis	15.0 (16.8)
Forb Seed	Purple Prairie Clover	Dalea purpurea	4.0 (4.5)
Mix**	Clasping Coneflower	Dracopis amplexicaulis	3.0 (3.4)
	Plains Coreopsis	Coreopsis tinctoira	2.0 (2.2)
	Goldenrod	Solidago altissima	1.0 (1.1)

needs and Sun/Part Shade or Shade light needs as listed in the current Grow Green Native and Adapted Landscape Plants guidance document\*\*\*. Plants must be a minimum size of 1-gallon (see Table 8, equivalency chart) and minimum of 1 plant per 100 square feet.

	Lazy Daisy	Aphanostephus sp.	1.0 (1.1)	
	Lemon Mint	Monarda citriodora	3.0 (3.4)	
	Sunflower (Common)	Helianthus annuus	5.0 (5.6)	
	Sunflower (Maximilian)	Helianthus maximiliana	4.0 (4.5)	-
	Milkweed (common or Butterfly Milkweed)	Asclepias syriaca or Asclepia tuberosa	0.1 (0.04)	
Tota	l recommended	seed mix application	Total rate is 26.0 lbs/ac	(17.0 lbs/ac grass, 9.0 lbs/ac forbs).
Cool	Cereal rye grain*	Secale cereale	34.0 (38.1)	Add at least one of the cool season
Season Cover	Oats*	Avena sativa	4.0 (4.5)	grasses to the warm-season mix between September 15 and March
Grasses	Western	Pascopyrum	5.6.(6.3)	·

5.6 (6.3)

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**Table 7. Rooted Plant Size Equivalents** 

Potential Substitute	Equivalent To

Wheatgrass\*

<sup>\*</sup> Plant only between September 15 to March 1. Non-persistent winter cover crop for erosion control.

<sup>\*\*</sup> Any unavailable species can be substituted with the same quantity of another species from this list or another species approved by an authorized City of Austin representative including Environmental Reviewer, Environmental Inspector, or Watershed Protection Department representative. The total pounds/acre (lbs/ac) of the proposed seed mix can be calculated based on the desired percentage of each seed in a mix.

<sup>\*\*\*</sup> www.austintexas.gov/department/grow-green/plant-guide

Quantity	Plant Size	Quantity	Plant Size
1	5-gallon	4	One-gallon
1	Two- or Three-gallon	2	One-gallon
4	4" pots or quarts	1	One-gallon
8	Plugs, live roots, saplings	1	One-gallon

## **Table 8. Seed Rate Calculation**

Multiple species native seed mixes require careful calculations to ensure proper planting rates. The example below is for illustrative purposes only.

Species	Seeding Rate (Ibs/ac)	Desired proportion of a species in the total mix (%)	Total quantity of seed in mix (lbs/ac)
Grass 1	7	.20	1.40
Grass 2	2	.20	0.40
Grass 3	24	.20	4.80
Forb 1	10	.20	2.00
Forb 2	8	.20	1.60
TOTALS		1.0 (100%)	10.2

## **Table 9. Seed Calculation Worksheet**

The amount of seed needed to be planted on a project shall be calculated before installation to ensure adequate seed is placed, and provided as a submittal. Table 9 is an example worksheet, followed by an example calculation. Information for calculation can be obtained from seed tags or the supplier.

Plant Group Desired Seeding Rate PLS (pure live seed) Bulk Rate Seeding Area (ac) Installed (lbs)
---

	(lbs/ac)	(lbs/ac)	
Grasses			
Forbs			
TOTAL			

## FORMULAS:

PLS (pure live seed) = (Purity × Germination) × 100. Can also use average PLS from seed tags.

Bulk Rate (lbs/ac) = Desired Seed Rate (lbs/ac)/PLS

Amt. of Seed to be Installed (lbs) = Bulk Rate (lbs/ac) x Seeding Area (ac)

#### Example:

Plant Group	Desired Seeding Rate (lbs/ac)	PLS [pure live seed] (% decimal)	Bulk Rate (Ibs/ac)	Seeding Area (ac)	Amt. of Seed to be Installed (lbs)
Grasses	131.00	0.81	161.73	1.50*	242.60
Forbs	65.34	0.87	75.10	1.50*	112.70
TOTAL	196.34	0.84 (ave.)	236.83	1.50	355.30

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

## 609S.6 - Management Practices

Management Practices include (1) weed management (pesticide application or mechanical removal) to so than 90 percent of the revegetation area is free of weeds listed in Table 3, (2) reseeding areas of poor germination to achieve coverage and height per 609S.8, with no bare areas greater than 10 s.f., and (3) replacement and replanting of rooted plants per 608S.5(O) [Plant Material Removal and Replacement] and 608S.7 (Acceptability of Plants).

Weeds, as defined in the Weed List (Table 3), shall be controlled in the most efficient manner possible. The timing of weed control may occur prior to soil disturbance, just before the installation of seed, and/or

<sup>\*</sup>Applied over the same 1.5 ac area.

during the period of plant establishment. Weed control shall be introduced at one or all of these times, so that the greatest control is achieved. The preferred method of control is to remove weeds, either by physical or mechanical means, when the site is conducive (e.g. when the ground is moist) to this approach.

The entire root system of perennial weeds shall be removed to prevent re-sprouting. Table 9 provides management practices for woody invasive vegetation. Weeds may be controlled with an approved contact, systemic herbicide, provided the product is used with appropriate care and is applied in accordance with label instructions and the following guidelines:

- 1. Herbicide shall not be applied when the wind is greater than 8 mph (12.9 kph),
- 2. Herbicide shall not be applied when rainfall is expected within 24 hours,
- 3. Herbicide shall not contact surface water, i.e. creeks, rivers, and lakes,
- 4. Herbicide shall not contact desirable vegetation (a wicking method shall be used, if necessary, to accurately contact target weed only during application).

**Table 10. Management Practices for Woody Invasive Vegetation** 

	Before Seeding			
Stems ≤1 inch	Pull with weed wrench			
Stems >1 inch	Cut at base and spray stump with appropriate herbicide within five minutes. Bag and dispose of seeds and fruit in landfill.			
	After Seeding			
Seedlings	Hand pull			
Sprouts	Foliar application of appropriate herbicide			

The Landscape Architect, Engineer or designated representative shall be consulted to determine appropriate weed control management when weeds are located in an environmentally sensitive location (e.g. near water or adjacent to a critical environmental feature).

Source: Rule No. R161-14.29, 12-30-2014; Rule R161-15.14, 1-4-2016.

# 609S.7 - Reseeding/Replanting

At locations that fail to show an acceptable stand of planting for any reason during the initial seeding, repair and/or reseed, replant locations as determined by the Landscape Architect, Engineer or designated representative. A successful stand of grasses and forbs should exhibit the following:

- · Seedlings with vigorous green foliage;
- Green leaves remaining throughout the summer, at least at the plant bases;
- Uniform density, with grasses and/or forbs well intermixed;
- · Minimum of 95% cover; and
- No patches of exposed soil greater than 10 s.f. in aerial extent.

The Owner or designated representative will inspect the seeding/planting during April of the calendar year following the year of initial seeding/planting and determine the necessity and extent of over seeding reseeding, or replanting required. Contractor shall ideally complete any required reseeding/replanting before May 15 of that year. This date may be extended if, in the opinion of the Owner and qualified landscape professional, the weather conditions before May 15 are not suitable for reseeding work. If the timing is bad, an annual cover crop can be over-seeded in a deficient area to temporarily provide coverage until a suitable time for seeding or planting perennial seed or rooted plants. If vegetation fails to grow and thrive, the soil must be tested to determine whether nutrient imbalances are responsible and, if so, an appropriate course of nutrient remediation (e.g., fertilizers, composts, topsoils, or other organic amendments) as recommended by a landscape professional must be implemented by the Contractor.

The Contractor shall meet the requirements for initial seeding and planting, including seeding method, seed mix, application rates, and slope texturing as applicable, unless otherwise agreed to in writing by the Owner and/or City staff. Corrected deficiencies will be re-inspected and approved by the Owner and designated representative, and final acceptance will be granted only upon satisfactory completion.

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

#### 609S.8 - Measurement

Work and acceptable material for Native Seed and Planting for Restoration will be measured by the square yard (square meter: 1 square meter equals 1.196 square yards) or by the acre (hectare: 1 hectare equals 2.471 acres), complete in place, so that all areas of a site that rely on vegetation for stability must be uniformly vegetated with a minimum of 95 percent total coverage with no bare areas exceeding 10 square feet (1.5 square meters) and a 1½ inch tall (40 millimeters) successful stand of plant materials. Ninety (90) percent of the overall planted area must be free of weeds listed in Table 3. Bare areas shall be re-prepared and reseeded as required by the Landscape Architect, Engineer or designated representative to develop an acceptable stand of vegetation.

Source: Rule No. R161-14.29, 12-30-2014; Rule No. R161-15.14, 1-4-2016.

## 609S.9 - Payment

The work performed and materials furnished and measured will be paid for at the unit bid price for Native Seeding and Planting for Restoration of the method specified on the Drawings.

The unit bid price shall include full compensation for furnishing all materials, including all topsoil, water, seed, or fertilizer or mulch and for performing all operations necessary to complete the work.

Payment will be made under one or more of the following pay items:

Pay Item No. 609S-A:	Topsoil and Seedbed Preparation	Per Square Yard.

Pay Item No. 609S-B:	Topsoil and Seedbed Preparation	Per Acre.
Pay Item No. 609S-C:	Native Seeding	Per Square Yard.
Pay Item No. 609S-D:	Native Seeding	Per Acre.
Pay Item No. 609S-E:	Rooted Plants	Per each.
Pay Item No. 609S-F:	Watering	Per 1,000 Gallons (Kgal).
Pay Item No. 609S-G:	Management Practices	Per Square Yard.
Pay Item No. 609S-H:	Management Practices	Per Acre.

# End

SPECIFIC CROSS REFERENCE MATERIALS			
Specification Item 609S Native Grassland Seeding and Planting for Erosion Control			
City of Austin Standard Specificatio	n <u>s</u>		
<u>Designation</u>	<u>Description</u>		
Item No. 130S	Borrow		
Item No. 601S	Salvaging and Placing Topsoil		
Item No. 606S	Fertilizer		
City of Austin Land Development Code			
<u>Designation</u>	<u>Description</u>		

Section 6-4	Water Conservation	

RELATED CROSS REFERENCE MATERIALS				
Specification Item 609S Native Grassland Seeding and Planting for Erosion Control				
City of Austin Standard Specification	<u>ns</u>			
<u>Designation</u>	<u>Description</u>			
Item No. 602S	Sodding for Erosion Control			
Item No. 604S	Seeding for Erosion Control			
Item No. 605S	Soil Retention Blanket			
Item No. 607S	Slope Stabilization			
Item No. 608S	Planting			
City of Austin Standards (Details)				
Standard No.	Description			
627S-1	Grass Lined Swale			
627S-2	Grass Lined Swale W/Stone Center			
633S-1	Landgrading			
Texas Department of Transportation	n: Standard Specifications for Construction and Maintenance of			

Highways, Streets, and Bridges	
<u>Designation</u>	<u>Description</u>
Item No. 160	Topsoil
Item No. 162	Sodding for Erosion Control
Item No. 164	Seeding for Erosion Control
Item No. 166	Fertilizer
Item No. 168	Vegetative Watering
Item No. 169	Soil Retention Blankets
Item No. 180	Wildflower Seeding
Item No. 192	Landscape Planting

#### ITEM NO. 610S - PRESERVATION OF TREES AND OTHER VEGETATION 12-7-18

## 610S.1 - Description and Definitions

This item shall govern the proper care, protection and treatment of trees and other vegetation in the vicinity of the permitted development activity (as defined in Land Development Code 25-1-21(27)). All work shall be performed in accordance with the City approved drawings and specifications (e.g. Standard Series 600) or as approved by the City Arborist (as defined below). Tree pruning and/or treatments shall be performed under the direct supervision of a qualified arborist (as defined below) or as allowed by the City Arborist.

#### **Definitions**

City Arborist - City official designated by the Director of the Planning and Development Review Department (Land Development Code 25-8-603) or as designated by the City Arborist.

Oak wilt - a tree disease caused by a fungus "Ceratocystis fagacearum" that infects the vascular system of Oak "genus Quercus" trees and prevents water transport through the trunk and canopy of the tree. This usually fatal tree disease can be spread by certain insects that come into contact with tree wounds or by interconnected tree roots. February through June is a high risk period due to the stage of the fungus and insect activity. See section 610S.4(H) for additional requirements for preventing Oak wilt infection.

Qualified Arborist - an individual engaged in the profession of arboriculture or closely related field who, through experience, education, and related training, possesses the competence to provide for, or supervise, the management of trees and other woody plants (as defined in the most current version of ANSI A300 (Part 1)-2001, section 4.1).

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 610S.2 - Submittals

The following is a list of the minimum submittal requirements for this specification item shall include:

- A. Identification of the location, type of protective fencing (i.e. A, B or C), materials of construction and installation details:
- B. Qualified Arborist credentials (i.e. proof of certification from the International Society of Arboriculture, licenses, resume and/or references);
- C. Type, location and construction details for proposed tree wells:
- D. Location, type, materials of construction and installation details for permeable paving;
- E. Proposed nutrient mix specifications and when required by the City Arborist, soil and/or foliar analysis for fertilizer applications.

## 610S.3 - Materials

## A. Protective Fencing and Signage

Protective fencing is designated as the materials used to protect the root zones of trees as illustrated in City of Austin Standard Detail 610S-1. Three basic types of protective fencing materials are allowed by the City of Austin. Type A and Type B are typical applications and shall be installed where damage potential to a tree root system is high, while Type C shall be installed where damage potential is minimal. The specific type of protective fencing for the work shall be as indicated on the drawings. Type C fence materials shall be subject to approval by the City Arborist. Type C fencing

shall be replaced by Type A or Type B fencing as directed by the City Arborist if it fails to perform the necessary function.

1. Type A Chain Link fence (Typical Application-high potential damage)

Type A protective fencing shall be installed in accordance with City of Austin Standard Details 610S-2 and 610S-4 and shall consist of a minimum five-foot (1.5 meters) high chain link fencing with tubular steel support poles or "T" posts.

2. Type B Wood Fence (Typical Application-high potential damage)

Type B protective fencing shall be installed in accordance with City of Austin Standard Details 610S-3 and 610S-5 and shall consist of any vertical planking attached to 2x4-inch ( $50 \times 100$  mm) horizontal stringers which are supported by 2x4-inch ( $50 \times 100$  mm) intermediate vertical supports and a 4x4-inch ( $100 \times 100$  mm) at every fourth vertical support .

3. Type C Other Materials (Limited Application-minimal potential damage)

The following materials may be permitted as alternates for limited or temporary applications (3 days or less) where tree damage potential is minimal (as determined by the City Arborist):

(a) High visibility plastic construction fencing.

The fabric shall be 4 feet (1.2 meters) in width and made of high-density polyethylene resin, extruded and stretched to provide a highly visible international orange, non-fading fence. The fabric shall remain flexible from -60°F to 200°F (-16°C to 93°C) and shall be inert to most chemicals and acid. The fabric pattern may vary from diamond to circular with a minimum unit weight of 0.4 lbs./Ft. (0.6 kilograms per meter).

The fabric shall have a 4-foot (1.2 meters) width minimum tensile yield strength (Horizontal) of 2000 psi [13.9 megaPascals], ultimate tensile strength of 2680 psi [18.5 megaPascals] (Horizontal) and a maximum opening no greater than 2 inches (50 mm).

(b) Other approved equivalent restraining material.

The fencing materials, identified in (a) and (b) above, shall be supported bysteel pipe, tee posts, U posts or  $2'' \times 4''$  (50 mm x 100 mm) timber posts that are a minimum of  $5\frac{1}{2}$  feet (1.68 meters) in height and spaced no more than 8 feet (2.44 meters) on centers. The fabric shall be secured to post by bands or wire ties.

# 4. Signage

A laminated sign, no smaller than 8.5 X 11 inches, shall be posted on each tree protective device, and at least every 100 linear feet on protective fencing, identifying the following information: Tree & Root Protection Zone, Per City of Austin code (Chapter 25-8, Subchapter B, Article 1) this protective device is to remain in place for the entirety of the development project and illegal removal is subject to fines and work suspensions. Additional information can be obtained at the City Arborist (512-974-1876) web site (http://www.ci.austin.tx.us/trees). Zona de Protección del Árbol y las Raíces: el dispositivo protector debe quedarse en el lugar para la totalidad del proyecto de la construcción. Para información adicional, contacta la Arborista Municipal (512) 974-1876 o http://www.ci.austin.tx.us/trees/trees\_spanish.htm.

#### B. Trunk Protection (Limited Application)

When indicated on the drawings or directed by the City Arborist tree trunk protection shall be provided in accordance with City of Austin Standard Details 610S-4 and 610S-5. Tree trunk protection shall consist of any 2 x 4-inch (50 x 100 mm) or 2 x 6-inch (50 x 150 mm) planking or plastic strapping and shall be attached in a manner that does not damage the tree.

## C. Tree Dressing

Wound treatments should not be used to cover wounds or pruning cuts, except when recommended for disease (see section 610S.4 (H)), insect, mistletoe, or sprout control (from ANSI A300 (Part 1)-2001, section 5.4.1).

## D. Tree Wells for Raised Grades

When existing grades are raised by more than 4 inches (10.16 cm), the tree root system shall be protected by the installation of tree wells in accordance with City of Austin Standard Detail 610S-6. Native stone or non-toxic timber shall be used for the separator wall of the well and PVC conforming to ASTM D-2729, SDR-35 shall be used for the aeration systems in fill areas.

## E. Permeable Paving (Environmental Criteria Manual Section 3.5.A.1)

Permeable segmented pavers in conjunction with PVC pipe aeration system or concrete on gravel base with cored holes shall be used to protect existing tree root zones when indicated on the drawings or directed by the City Arborist.

## F. Fertilizer

Humate/nutrient solutions with mycorrhizae components or soil injection at recommended rates are to be used when appropriate. Construction which will be completed in less than 90 days may use materials at half the recommended rates. Alternative organic fertilizer materials are acceptable when approved by the City Arborist.

#### 610S.4 - Construction Methods

## A. Protective Fencing

All trees and shrubs in the proximity of the construction site shall be carefully checked for damage prior to initiation of the permitted development activity.

All individual or groups of trees, shrubs, and natural areas shown to be protected on the drawings or identified to be protected by the City Arborist, shall be protected during construction with temporary fencing as indicated on the drawings or as directed by the City Arborist.

Protective fences (section 610S.4.A) shall be installed prior to the start of any site preparation work (clearing, grubbing, or grading), and shall be maintained in functioning condition throughout all phases of the construction project.

Protective fence locations in close proximity to intersecting streets or drives shall adhere to the sight distance (Section 1.3.1.C.6) and desirable sight triangle (Figure 1-6 criteria found in the City of Austin Transportation Criteria Manual).

- 1. Protective fences shall be constructed at the locations (typically the outer limits of the critical root zone) and with materials indicated on the drawings to prevent the following (Environment Criteria Manual, Appendix P-2, Note 6):
  - (a) Soil compaction in the root zone area resulting from vehicular traffic or storage of equipment or materials.
  - (b) Critical root zone disturbances due to grade changes [greater than 4" (10.16 cm) cut or fill] or trenching not reviewed and authorized by the City Arborist.
  - (c) Damage to exposed roots, trunks or limbs by mechanical equipment.
  - (d) Other activities detrimental to trees such as chemical storage, concrete truck cleaning, and fires.
- 2. Exceptions to the installation of protective fences at the tree drip lines may be permitted in the following cases:

- (a) Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development, the fence shall be erected no more than 2 feet (0.6 meters) beyond the area of disturbance unless approved by the City Arborist:
- (b) When permeable paving is to be installed within a tree's critical root zone, the fence shall be erected at the outer limits of the permeable paving area (prior to any site grading so that this enclosed area is graded separately to minimize root damage);
- (c) When trees are located close to a proposed building or other construction activity (Environment Criteria Manual, Appendix P-2, Note 6.c), the fence shall be erected up to 10 feet (3 meters) to allow work space between the fence and the structure. Apply organic mulch to a depth of 8 inches [30.48 cm] in the unprotected root zone area;
- (d) When there are street-side pedestrian walkways, fences shall be constructed in a manner that does not obstruct safe passage;
- (e) When there are severe space constraints due to tract size or other special requirements, the Contractor shall contact the City Arborist to discuss alternatives.

When any of the exceptions listed above will result in a fence being located closer than five (5) feet (1.5 meters) to a tree trunk, the Contractor shall also protect the trunk with strapped-on planking to a height of 8 feet [2.4 meters] (or to the limits of lower branching) in addition to the fencing requirement (City of Austin Standard Details 610S-4 and 610S-5).

## B. Pruning and Repair of Damage

Tree pruning, to provide clearance for the work and/or to remove hazards, shall be performed under the direct supervision of a qualified arborist and shall follow standards identified in ANSI A300 (Part 1), "Pruning". A minimum clearance height of eight (8) feet (2.4 meters) above the street level must be provided and maintained for all existing trees if adjacent to a sidewalk. However, if the limbs of trees overhang the curb line or edge of travel lane of any street, a minimum clearance height of fourteen (14) feet (4.2 meters) is required (Transportation Criteria manual section 6.2.3,A, 4, "Clearance Height"). Pruning shall provide the minimum clearance needed to perform the work or remove a hazard unless otherwise directed by the City Arborist to comply with transportation criteria or to mitigate for damage.

If tree damage compromises a tree's structural integrity then the area shall be adequately secured until a qualified arborist makes an assessment of the tree and corrective actions are completed with approval from the City Arborist. Damage to oak trees shall be treated immediately, with consideration for site safety, to reduce the risk of Oak Wilt infection (See 610S.4.H, "Oak Wilt Prevention"). Tree root wounds shall be treated to remove loose, damaged tissue from in and around the wound or if necessary the root shall be cut cleanly and covered with topsoil, or other material approved by the City Arborist, to prevent drying of root tissue and to create a favorable environment for root sprouting. Trunk wounds shall also be treated to remove loose, damaged tissue around the wound. Tree canopy repairs shall be performed in accordance with the most current version of ANSI A300 (Part 1), "Pruning", to prevent further damage to the tree and to promote recovery of the tree to sound condition. The ANSI standard describes proper pruning methods for limb removal and for making finish pruning cuts.

Trees damaged or removed without prior approval or where minimum design criteria is exceeded due to failure to maintain approved tree protection shall be mitigated (Environmental Criteria Manual section 3.5.4, "Mitigation Measures") in accordance with Land Development Code Chapter 25-8, Subchapter B, Article 1.

All trees damaged during construction shall receive an application of fertilizer within the drip line conforming to Standard Specification Item No. 606S, "Fertilizer" at the rate of 4 pounds per caliper inch (.07 kilograms per caliper mm).

## C. Cutting and Filling Around Trees

When the depth of an excavation or embankment exceeds 4 inches (10.16 cm) within the critical root zone of any tree with a trunk diameter greater than 8 inches (200 mm), the City Arborist may require a tree well to be constructed per the City of Austin approved specifications and details (Section 610S.3.D and City of Austin Standard Detail 610S-6).

## D. Paving Around Trees

Where new paving within the ½ critical root zone of any tree greater than a 8 inches (10.16 cm) diameter is approved, a permeable pavement and aeration system may be required by the City Arborist per the City of Austin Standard Detail (Section 610S.3.E, Environmental Criteria Manual Section 3.5.3.A.1 and Figure 3-8) must be installed as indicated on the Drawings, except for street construction.

#### E. Tree Removal

Tree removal shall comply with Land Development Code Chapter 25-8, Subchapter B, Article 1. An approved permit, or an approved site plan is required for removal of trees 8" and larger (see Environmental Criteria manual section 3.3.2.A.2 and figure 3-1 for measurement standards) with additional requirements for City Parkland properties and for Hill Country Roadway Corridor sites. Trees 19 inches in diameter and greater are defined as protected trees and require specific review from the City Arborist to approve a permit or site plan for removal. In addition heritage trees require a more extensive evaluation by the City Arborist and may require rulings from boards and commissions.

All trees to be removed shall be performed in a manner that does not damage the canopies, trunks or root systems of remaining trees and that protects all existing facilities, improvements and vegetation. Removal of oak trees shall follow the Oak Wilt Prevention procedures per the City of Austin Standards (Section 610S.4,(H)). All tree material shall be removed from the site unless authorized by the City Arborist or if it will be used as wood chips or mulch.

When a tree or shrub is scheduled for removal, it shall be cut to a maximum depth of 12 inches (30.5 cm) below the surrounding grade (the tree(s) should be removed at grade, and with hand saws, in situations where other tree root systems are present which are to be preserved). When applicable, after tree removal, soil shall be placed in the hole to a depth matching the existing grade.

All damage resulting from tree removal or pruning shall be repaired at the Contractor's own expense and shall follow guidelines in this specification.

## F. Final Cleanup

All temporary tree and shrub preservation and protection measures shall be removed when the construction has been completed and any mulch applications shall be removed or reduced to no more than 3 inches (7.62 cm) depth.

## G. Root Zone Aeration and Fertilization

As a component of an effective remedial tree care program per Environmental Criteria Manual section 3.5.4, preserved trees within the limits of construction may require soil aeration and supplemental nutrients. Soil and/or foliar analysis should be used to determine the need for supplemental nutrients. The City Arborist may require these analyses as part of a comprehensive tree care plan. Soil pH shall be considered when determining the fertilization composition as soil pH influences the tree's ability to uptake nutrients from the soil. If analyses indicate the need for supplemental nutrients, then humate/nutrient solutions with mycorrhizae components are highly recommended. In addition, soil analysis may be needed to determine if organic material or beneficial microorganisms are needed to improve soil health. Materials and methods are to be approved by the City Arborist (512-974-1876) prior to application. The owner or general contractor shall select a fertilization contractor and ensure coordination with the City Arborist.

Pre-construction treatment should be applied in the appropriate season; ideally the season preceding the proposed construction. Minimally, areas to be treated include the entire critical root zone of trees as depicted on the City approved plans. Treatment should include, but not limited to, fertilization, soil treatment, mulching, and proper pruning.

Post-construction treatment should occur during final revegetation or as determined by a qualified arborist after construction. Construction activities often result in a reduction in soil macro and micro pores and an increase in soil bulk density. To ameliorate the degraded soil conditions, aeration via water and/or air injected into the soil is needed or by other methods as approved by the City Arborist. The proposed nutrient mix specifications and soil and/or foliar analysis results need to be provided to and approved by the City Arborist prior to application (Fax # 512-974-3010). Construction which will be completed in less than 90 days may use materials at ½ recommended rates. Alternative organic fertilizer materials are acceptable when approved by the City Arborist. Within 7 days after fertilization is performed, the contractor shall provide documentation of the work performed to the City Arborist, Planning and Development Review Department. P.O. Box 1088, Austin, TX 78767. This note should be referenced as item #1 in the Sequence of Construction.

## H. Oak Wilt Prevention Policy

#### 1. Purpose and Scope

The purpose of this Oak Wilt Prevention Policy is to identify measures that city staff and city-hired contractors and their sub-contractors, who perform the services of removing or trimming trees, will take to prevent the spread of oak wilt.

#### 2. Definitions

Oak Wilt Disease: A tree disease caused by the fungus, Ceratocystis fagacearum. The fungus infects the vascular system of a tree. The vascular system contains vessels which transport moisture throughout the tree. The vessels of an infected tree effectively become blocked by the infection of the fungus, and cannot transport adequate moisture to sustain a healthy or living tree. In most cases, the end result is tree mortality.

# 3. Prevention Policy

- (a) Prior to beginning field work, all city staff associated with projects involving potential contact with oak trees shall be made aware of the city's official Oak Wilt Policy by receiving and reading a written copy of this policy. Staff receiving a written copy of the policy shall include, but not limited to, project managers, equipment operators responsible for removing or trimming trees, or operators using heavy equipment which could cause wounding of susceptible oaks in the use of the equipment. In addition, individual city departments will provide a written copy of the Oak Wilt Policy to contractors participating in city projects in areas where oak trees are present before initiating field work.
- (b) When possible, city staff and contractors should avoid trimming, pruning, or wounding Live Oaks and Red Oaks (Spanish, Shumard, Texas Red, and Blackjack oaks) from February through June.
- (c) At all times and irrespective of limb size, all cuts and wounds to oak trees shall be dressed immediately using a non-phytotoxic tree wound dressing. Stump cuts and damaged roots (both above and below ground) shall also be dressed.
- (d) Disinfection of pruning tools, saws, and related equipment is mandatory during the trimming or pruning of oak trees. Disinfection of tree removal and trimming equipment shall occur before work begins in a project area, between work in individual oak trees, and again prior to leaving a project area. Acceptable disinfectants include either aerosol disinfectant or a 10 percent bleach-water solution.

\*NOTE: Although this policy would require the disinfection of pruning equipment before and between oak trees as a precaution, research does not substantiate disinfection as a means of preventing the transmission of the oak wilt disease.

## 4. Disposal Policy

- (a) Chipping or shredding the wood from infected trees to use as mulch is an acceptable means of recycling the wood. Chipping or shredding allows the wood to dry out quickly, thereby killing the fungus.
- (b) Burning diseased wood is an acceptable means of disposal. Burning diseased logs will kill the fungus, and the fungus will not spread with the smoke.
- (c) Logs from diseased Red Oaks, that are not chipped, shredded, or burned shall be disposed of at a landfill.
- (d) Firewood from diseased Red Oak trees shall not be stored near healthy trees where fungal spores or insects that carry the spores have the potential to spread the fungus to healthy trees. It is recommended to store oak firewood under a sheet of clear plastic, tightly sealing the edges of plastic with soil or bricks. Doing so will prevent any spore carrying beetles from escaping and will solarize and heat the stored firewood to speed the drying process. It is also recommended to use clear plastic, as black plastic will reveal any escape holes to the beetles.
- (e) In situations where diseased Red Oak trees are identified and are not accessible for chipping, shredding, or removal, the trunk of the diseased tree should be girdled, and the stem treated with an appropriate herbicide to deaden the tree and hasten the desiccation and drying of the wood below the minimum moisture content that could support the development of fungal spores.

## 610S.5 - Measurement

Tree and shrub pruning, fencing, drains, fertilization, etc. will not be measured for payment unless included as a contract pay item. Tree wells for tree protection will be measured by the units, complete in place, conforming to the Drawings and City of Austin Standard Detail 610S-6, "Tree Protection, Tree Wells".

Removal of existing trees will be measured per each tree.

#### 610S.6 - Payment

The work and materials prescribed herein with the exception of the Protective Fencing and Tree Well (Tree Protection) will not be paid for directly but shall be included in the unit price bid for the item of construction in which this activity is used, unless a payment item is included as a contract pay item.

# Payment will be made under:

Pay Item 610S-A:	Protective Fencing Type A Chain Link fence (Typical Application-high damage potential)	Per Lineal Foot
Pay Item 610S-B:	Protective Fencing Type B Wood Fence (Typical Application-high damage potential)	Per Lineal Foot
Pay Item 610S-C:	Protective Fencing Type C Other Materials (Limited Application-minimal damage potential)	Per Lineal Foot

Pay Item 610S-D:	Tree Well (Tree Protection)	Per Each
Pay Item 610S-E:	Tree Trunk Protection (Wood Planking)	Per Each
Pay Item 610S-R:	Removal of Existing Trees	Per Each

Source: Rule No. R161-18.24, 12-7-2018.

# End

SPECIFIC CROSS REFERENCE MATERIALS			
Specification Item 610S, "Preservation of Trees and Other Vegetation"			
City of Austin Standard Spo	ecification Items		
Designation	<u>Description</u>		
Item No. 606S	Fertilizer		
City of Austin Standard De	tails_		
<u>Designation</u>	<u>Description</u>		
Item No. 610S-1	Tree Protection Fence Locations		
Item No. 610S-2	Tree Protection Fence, Type A, Chainlink		
Item No. 610S-3	Tree Protection Fence, Type B, Wood		
Item No. 610S-4	Tree Protection Fence, Modified Type A, Chainlink		

Item No. 610S-5	Tree Protection Fence, Modified Type B, Wood
Item No. 610S-6	Tree Protection, Tree Wells
ty of Austin Transportation	n Criteria Manual
<u>Designation</u>	<u>Description</u>
Section 1.3.1.C.6	Sight Distance
Section 6.2.3.A.4	Clearance Height
Figure 1-6	Desirable Sight Triangle
ity of Austin Environmenta	l Criteria Manual
<u>Designation</u>	<u>Description</u>
Appendix P-2, Note 6	Exceptions to Installing Fences
Appendix P-2, Note 6c	Trees close to proposed buildings
Appendix P-6	Remedial Tree Care Notes
Section 3.3.2.A.2	Diameter of trees
Section 3.5.0	Design Criteria
Section 3.5.3.A.1	Permeable Paving
Figure 3-8	Example of Minimum Design Criteria Applied to Permeable Parking
ity of Austin Land Developr	ment Code

<u>Designation</u>	<u>Description</u>	
Section 25-8-603	Tree Protection Administration	
Section 25-8-623	Inspection by City Arborist	
ASTM, American Society for Testing and Materials		
<u>Designation</u>	<u>Description</u>	
D-2729	Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings	

RELATED CROSS REFERENCE MATERIALS		
Specification 610S, "Preservation of Trees and Other Vegetation"		
City of Austin Standard Specificatio	n Items	
<u>Designation</u>	<u>Description</u>	
Item No. 101S	Preparing Right of Way	
Item No. 102S	Clearing and Grubbing	
Item No. 111S	Excavation	
Item No. 120S	Channel Excavation	
Item No. 132S	Embankment	
Item No. 608S	Planting	

# Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges Designation Description Item No. 100 Preparing Right of Way Item No. 110 Excavation Item No. 132 Embankment Item No. 158 Specialized Excavation Work

Furnishing and Placing Topsoil

Fertilizer

Vegetative Watering

Item No. 160

Item No. 166

Item No. 168

Previous Versions: 10/30/09, 06/21/07, 05/21/01

and 04/17/86

Item No. 628S Sediment Containment Dikes

## 628S.1 Description

This item shall govern the provision and placement of temporary filtration dikes along or across such areas as indicated on the Drawings. This method shall be used during construction only and its purpose shall be to temporarily control erosion by intercepting and retaining sediment.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 628S.2 Submittals

The submittal requirements for this specification item shall include:

A. Locations and Types of containment dikes (Hay Bales or Triangular Sediment Filter Dike).

# B. Seeding

- 1. Identification of the type, source, mixture, pure live seed (PLS) and rate of application of the seeding.
- 2. Type of mulch.
- 3. Type of tacking agent.
- 4. Type and rate of application of fertilizer.

## 628S.3 Materials

## A. Hay Bales

"Hay Bales" shall be free of Johnson Grass or other nocuous weeds. The bales shall consist of either hay or straw in good condition and be securely tied with wire. Stakes for anchoring bales shall be #4 (10M) reinforcing bars, 1/2 inch (12.5 mm) steel pickets, or 2 x 2 inch (50 x 50 mm) wooden stakes. Hay bales shall be limited to drainage areas less than 2,500 square feet (0.02 hectares).

#### B. Filter Dike

"Filter Dike" shall be prefabricated from 6x6-D2.9xD2.9 (150x150-MW19xMW19) WWF and 4.5 oz. (127 grams) non-woven polyester filter fabric securely fastened to WWF with galvanized shoat rings or j-clips. A 12-inch (300-mm) skirt shall be a continuous extension of the filter fabric on the upstream face.

The filter fabric shall extend beyond the dike joints to provide a 3-inch (75-mm) overlap. Ends of dike not lapped with filter fabric shall be plugged with filter fabric.

and 04/17/86

## 628S.4 Construction Methods

The Contractor may select the material for the dikes, unless otherwise indicated, conforming to the details on the Drawings and Standard Detail Numbers 628S and 628S-1.

Bales shall be placed with ends tightly abutting the adjacent bales. Each bale shall be embedded in the soil a minimum of 4 inches (100 mm) and a maximum of 6 inches (150 mm). Bales shall be securely anchored in place by a minimum of 2 stakes per bale. The first stake in each bale shall be angled toward the previously placed bale to force the bales together. Stakes shall be embedded in the soil a minimum of 1 1/2 feet (0.45 meters). Bales that are not able to be imbedded and are place on impervious cover should be placed level with the concrete and have all bales butted end to end with no voids or gaps between them. Bales shall be bound by either wire or nylon string. Bales shall be replaced every 2 months or more often during wet periods.

For filter dikes, the filters shall be placed with ends tightly abutting the adjacent filter. Each filter and skirt shall be securely anchored in place using 6 inch (150 mm) staples at a maximum spacing of 12 inches (300 mm) on center. Anchoring on impervious areas shall be accomplished with gravel bags placed at 18 inches (450 mm) on center or with a nominal 1 inch by 4 inch (25 mm by 100 mm) board nailed at 18 inches (450 mm) on center.

Silt accumulation behind hay bales and triangular sediment filter dikes shall be removed at a maximum depth of 6 inches (150 mm) or when, in the opinion of the Engineer or designated representative, the structure ceases to function as intended.

All dikes shall be inspected by the Contractor at least monthly and after each rainfall. Dikes shall be repaired or replaced when necessary or as directed by the Engineer or designated representative.

After completion of construction or when directed by the Engineer or designated representative the dike shall be removed and the site re-graded to the final grades. Any depression shall be filled and any accumulations of silt shall be spread or removed to a permitted disposal area. After removal of the dike the area shall be graded and seeded conforming to Item No. 604S, "Seeding for Erosion Control".

## 628S.5 Measurement

The work performed and the materials furnished as prescribed by this item will be measured by the lineal foot (lineal meter: 1 lineal meter equals 3.281 lineal feet) of "Sediment Containment Dikes", complete in place.

## 628S.6 Payment

The work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price per lineal foot of "Sediment Containment Dikes" indicated on the Drawings. The Unit bid price shall include full compensation for: (a) furnishing, hauling and placing all materials including all labor, tools, equipment and incidentals needed to complete the work, (b) the repair and/or replacement of materials, (c) the removal and disposal of all silt and debris and (d) the removal of all dikes, silt and debris after completion of construction or when directed by the Engineer or designated representative.

Current Version: December 31, 2013 Previous Versions: 10/30/09, 06/21/07, 05/21/01 and 04/17/86

When indicated on the Drawings, payment for sediment containment will be made under:

Pay Item No. 628S-A: Sediment Containment Dikes with hay bales Per Lineal Foot.

Pay Item No. 628S-B: Sediment Containment Dikes with filter fabric Per Lineal Foot.

End

and 04/17/86

# SPECIFIC CROSS REFERENCE MATERIALS

Specification 628S, "Sediment Containment Dike"

# City of Austin Standard Details

<u>Designation</u> <u>Description</u>

Number 628S Triangular Sediment Filter Dike

Number 628S-1 Hay Bale Dike

# City of Austin Standard Specifications

<u>Designation</u> <u>Description</u>

Item No. 604S Seeding for Erosion Control

## City of Austin Standard Contract

Section Description

00300U Bid Form (Unit Prices)

# RELATED CROSS REFERENCE MATERIALS

Specification 628S, "Sediment Containment Dike"

# City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 101S	Preparing Right of Way
Item No. 102S	Clearing and Grubbing
Item No. 111S	Excavation
Item No. 120S	Channel Excavation
Item No. 401S	Structural Excavation and Backfill
Item No. 406S	Reinforcing Steel
Item No. 602S	Sodding for Erosion Control
Item No. 605S	Soil Retention Blanket
Item No. 606S	Fertilizer
Item No. 608S	Planting
Item No. 610S	Preservation of Trees and Other Vegetation
Item No. 620S	Filter Fabric

## RELATED CROSS REFERENCE MATERIALS (Continued)

Specification 628S, "Sediment Containment Dike"

# Texas Department of Transportation: Standard Specifications for Construction and

# Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	<u>Description</u>
Item No. 100	Preparing Right of Way
Item No. 110	Excavation
Item No. 132	Embankment
Item No. 158	Specialized Excavation Work
Item No. 166	Fertilizer
Item No. 168	Vegetative Watering
Item No. 169	Soil Retention Blanket
Item No. 204	Sprinkling

## Item No. 641S **Stabilized Construction Entrance**

# 641S.1 Description

This item governs the construction of a stabilized pad of crushed stone located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk or parking area. The removal of the stabilized pad of crushed stone shall also be included in the item. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking or deposition of sediment onto public right of way (Environmental Criteria Manual Section 1.4.2.N.4).

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 641S.2 Submittals

The submittal requirements for this specification item shall include:

- A. Source, type and gradation of rock
- B. Drainage technique (i.e. drainage swale or entrance grading) proposed to prevent runoff from exiting the construction site.

#### 641S.3 Materials

Aggregate for construction shall conform to the following gradation:

Table 1: Aggregate Gradation Chart (TEX 401-A, % Retained per sieve)			
US 5 inch (SI 125 mm)	US 3 inch (SI 75 mm)		
0	100		

## 641S.4 Construction Methods

All trees, brush, stumps, obstructions and other objectionable material shall be removed and disposed of in a manner that will not interfere with the excavation and construction of the entrance as indicated on the Drawings or as presented in Standard Details No. 641S-1. The entrance shall not drain onto the public right of way or shall not allow surface water runoff to exit the construction site.

When necessary, vehicle wheels shall be cleaned to remove sediment prior to entrance onto public right of way. When vehicle washing is required, it shall be done on an area stabilized with crushed stone, which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch or watercourse through use of sand bags, gravel, boards, silt fence (Standard Specification Item No 642S) or other methods approved by the Engineer or designated representative.

The entrance shall be maintained in a condition that will prevent tracking or disposition of sediment onto public right of way. This restriction may require periodic top dressing with additional stone as conditions demand, as well as the repair and/or cleanout of any measures used to trap sediment. All sediment that is spilled, dropped, washed or tracked onto public right of way must be removed immediately.

#### Current Version: June 21, 2007

#### 641S.5 Measurement

Acceptable work performed as prescribed in this item will be measured by unit of each stabilized construction entrance installed.

## 641S.6 Payment

The work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price per lineal foot of "Stabilized Construction Entrance". The price shall include full compensation for furnishing, hauling and placing all materials, labor, tools, equipment and incidentals necessary to complete the work including inspecting, repairing, replacing and relocating existing fencing, removal of silt and removal and disposal of all materials at the completion of construction.

Payment, when included as a contract pay item, will be made under:

Pay Item No. 641S: Stabilized Construction Entrance Per Each.

## End

# **SPECIFIC** CROSS REFERENCE MATERIALS

Specification 641S, "Stabilized Construction Entrance (SCE)"

City of Austin Environmental Criteria Manual

<u>Description</u>

Section 1.4.2.N.4 Stabilized Construction Entrance "Design Criteria"

<u>City of Austin Standard Details</u> <u>Designation</u> <u>Description</u>

Number 641S-1 Stabilized Construction Entrance

<u>City of Austin Standard Specifications</u>

<u>Designation</u>

Item No. 642S

<u>Description</u>

Silt Fence (SF)

## **RELATED** CROSS REFERENCE MATERIALS

# City of Austin Environmental Criteria Manual

DesignationDescriptionSection 1.4.2.JSandbag BermFigure 1-11Sand Bag BermSection 1.4.2.GSilt Fence

City of Austin Standard Specifications

<u>Designation</u> <u>Description</u>

Item No. 101S Preparing Right of Way Item No. 102S Clearing and Grubbing

Item No. 111S Excavation

Item No. 120S Channel Excavation

Item No. 401S Structural Excavation and Backfill

Item No. 610S Preservation of Trees and Other Vegetation

<u>Texas Department of Transportation</u>: <u>Standard Specifications for Construction</u> and Maintenance of <u>Highways</u>, <u>Streets</u>, <u>and Bridges</u>

Designation Description

Item No. 100 Preparing Right of Way

# Current Version: June 21, 2007 Previous Versions: 08/20/03, 03/08/96 and 05/23/00

Item No. 110	Excavation
Item No. 132	Embankment
Item No. 158	Specialized Excavation Work
Item No. 168	Vegetative Watering

Previous Versions: 10/30/09, 06/21/07, 05/23/00 and 05/01/90

ITEM NO. 642S SILT FENCE

## 642S.1 Description

This item shall govern the provision and placement of a silt fence fabric fence (Environmental Criteria Manual Section 1.4.5.G) including maintenance of the fence, removal of accumulated silt, removal of the silt fence and re-vegetation of disturbed areas upon completion of the project.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

## 642S.2 Submittals

The submittal requirements for this specification item shall include:

- A. Source, manufacturer, characteristics and test data for the silt fence fabric,
- B. Manufacturer, characteristics and test data for the posts and wire fence.
- C. Re-vegetation program, including:
  - 1. Identification of the type, source, mixture, Pure Live Seed (PLS) and rate of application of the seeding.
  - 2. Type of mulch.
  - Type of tacking agent.
  - 4. Type and rate of application of fertilizer.

## 642S.3 Materials

## A. Fabric

#### General:

The silt fence fabric shall be of nonwoven polypropylene, polyethylene or polyamide thermoplastic fibers with non-raveling edges. The silt fence fabric shall be non-biodegradable, inert to most soil chemicals, ultraviolet resistant, unaffected by moisture or other weather conditions, and permeable to water while retaining sediment. The silt fence fabric shall be supplied in rolls a minimum of 36 inches (0.9 meter) wide.

## 2. Physical Requirements:

The fabric shall meet the requirements presented in Table 1, when sampled and tested in accordance with the methods indicated herein, on Standard Detail No. 642S-1 and/or on the Drawings.

## B. Posts:

Posts shall be steel Tee or Y-posts, not less than 4 feet (1.22 meters) in length with a minimum weight of 1.25 pounds per foot (1.86 kilograms per meter) with a minimum Brinell Hardness of 143. Hangers shall be adequate to secure fence and fabric to posts. Posts and anchor plates shall conform to ASTM A-702. Caps are required (\*not specifying discretionary criteria).

## C. Wire Fence:

Wire fence shall be welded wire fabric 2 in. x 4 in. 12.5 SWG, wire diameter 0.099 in ( $\pm 0.005$  in.), and shall conform to Standard Specification Item No. 406. "Reinforcing Steel".

TABLE 1. Silt Fence Fabric Requirements			
Physical Properties	Method	Requirements	
Fabric Weight in ounces per square yard (grams/square meter)	TEX-616-J <sup>1</sup>	5.0 minimum (150 minimum)	
Equivalent Sieve Opening Size: US Standard (SI Standard sieve size)	CW-02215 <sup>2</sup>	40 to 100 (425 to 150 □m)	
Mullen Burst Strength: lbs. per sq. inch (psi) megaPascal (mPa)	ASTM D- 3786 <sup>3</sup>	280 minimum (1.9 minimum)	
Ultraviolet Resistance; % Strength Retention	ASTM D- 1682 <sup>4</sup>	70 minimum	

- <sup>1</sup> TxDoT Test Method Tex-616-J, "Testing of Construction Fabrics".
- US Army Corps of Engineers Civil Works Construction Guide Specification CW-02215, "Plastic Filter Fabric".
- ASTM D-3786, "Test Method for Hydraulic Bursting Strength of Knitting Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method".
- ASTM D-1682, " Test Methods for Breaking Load and Elongation of Textile Fabrics ".

## **642S.4 Construction Methods**

The silt fence fabric shall be securely attached to the posts and the wire support fence with the bottom 12 inches (300 mm) of the material buried in a trench a minimum of 6 inches (150 mm) deep and 6 inches (150 mm) wide to prevent sediment from passing under the fence. When the silt fence is constructed on impervious material, a 12-inch (300-mm) flap of fabric shall be extended upstream from the bottom of the silt fence and weighted to limit particulate loss. No horizontal joints will be allowed in the silt fence fabric. Vertical joints shall be overlapped a minimum of 12 inches (300 mm) with the ends sewn or otherwise securely tied.

The silt fence shall be a minimum of 24 inches (0.6 meter) high. Posts shall be embedded a minimum of 12 inches (300 mm) in the ground, placed a maximum of 8 feet (2.4 meters) apart and set on a slight angle toward the anticipated runoff source. When

Previous Versions: 10/30/09, 06/21/07, 05/23/00 and 05/01/90

directed by the Engineer or designated representative, posts shall be set at specified intervals to support concentrated loads.

\* Per OSHA §1926.701, 'all protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement'. Caps must be large enough to dissipate the forces of impact to prevent impalement from a reasonably foreseeable fall distance. It should be noted that the use of impalement protection caps is but one method of protection; covers or wooden troughs can be another means of meeting the guarding requirement. For City of Austin purposes, this also applies to t-posts and wooden stakes.

The silt fence shall be repaired, replaced, and/or relocated when necessary or as directed by the Engineer or designated representative. Accumulated silt shall be removed when it reaches a depth of 6 inches (150 mm).

#### 642S. 5 Measurement

The work performed and the materials furnished under this item will be measured by the lineal foot of "Silt Fence", complete in place.

## 642S.6 Payment

The work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price per lineal foot of "Silt Fence". The price shall include full compensation for furnishing, hauling and placing all materials, labor, tools, equipment and incidentals necessary to complete the work including inspecting, repairing, replacing and relocating the fence, removal of silt and removal and disposal of all materials at the completion of construction in and re-vegetation of disturbed areas.

Payment will be made under:

Pay Item No. 642S: Silt Fence for Erosion Control Per Lineal Foot.

**END** 

### **SPECIFIC** CROSS REFERENCE MATERIALS

Specification 642S, "Silt Fence"

City of Austin Environmental Criteria Manual

<u>Designation</u> <u>Description</u>
Section 1.4.5.G Silt Fence

City of Austin Standard Details

<u>Designation</u> <u>Description</u>

Number 642S-1 Silt Fence

City of Austin Technical Specifications

<u>Designation</u> <u>Description</u>

Item No. 406 Reinforcing Steel

American Society For Testing and Materials (ASTM)

<u>Designation</u> <u>Description</u>

A-702 Specification for Steel Fence Posts and Assemblies,

Hot Wrought

D-1682 Test Methods for Breaking Load and Elongation of

**Textile Fabrics** 

D-3786 Test Method for Hydraulic Bursting Strength of Knitting

Goods and Nonwoven Fabrics: Diaphragm Bursting

Strength Tester Method

Texas Department of Transportation Manual of Testing Procedures

Designation Description

Tex-616-J Testing of Construction Fabrics

U.S. Army Corps of Engineers

<u>Designation</u> <u>Description</u>

CW-02215 Civil Works Construction Guide Specification

"Plastic Filter Fabric"

### **RELATED** CROSS REFERENCE MATERIALS

Specification 642S, "Silt Fence"

### City of Austin Environmental Criteria Manual

<u>Designation</u> <u>Description</u>

Table 1-1.3 Recommended Design Values For Functional

Controls

Table 1-2 Maximum Water Depth At The Barrier

### City of Austin Standard Specifications

<u>Designation</u> <u>Description</u>

Item No. 101SPreparing Right of WayItem No. 102SClearing and Grubbing

Item No. 111S Excavation

Item No. 120S Channel Excavation

Item No. 401S Structural Excavation and Backfill

Item No. 610S Preservation of Trees and Other Vegetation

ITEM NO. 648S MULCH SOCK

#### 648S.1 Description

A Mulch sock consists of material encased in a tube of mesh. It is used to intercept, settle, and filter sheet flow and pond runoff. Mulch socks provide an environmentally sensitive and cost-effective alternative to sediment fences.

#### 648S.2 Submittals

The submittal requirements for this specification item shall include the following:

#### A. Mulch Material

- 1. A small sample of mulch material proposed to be used on the site will be provided to the engineer.
- 2. Provide a designated project stockpile of mulch for sampling and testing at the producer's site.
- 3. A copy of the lab analysis, performed by an STA-certified lab, verifying that the mulch material meets the requirements of Table 1.

Table 1			
Item	Requirement	Reference Specification	
Particle Size	3" minus screening process	Equivalent to TXDOT item 161, Compost, Section 1.6.2.B, Wood Chip requirements	
рН	5.5 – 8.5	TMECC 04. 11-A, "1.5 Slurry pH"	
Organic Matter Content	25%, dry weight basis	TMECC 05.07-A, "Loss-On- Ignition Organic Matter Method"	

#### B. Tube Material

The CONTRACTOR shall submit a sample of the material that the CONTRACTOR proposes to use on the project. A sample of the material should be accompanied by material data sheet identifying composition, ability of the material to biodegrade, and size of openings in tube at a minimum.

#### Previous Versions: new

#### 648S.3 Materials

- A. Mulching material can be manufactured on or off the project site and may consist of:
  - Shredded bark
  - 2. Stump grindings
  - 3. Composted bark
- B. The mulch shall have the following composition:
  - 1. Wood chips shall be produced from a 3-inch minus screening process (equivalent to TxDOT item 161, Compost, Section 1.6.2.B Wood Chip Requirements).
  - 2. Large portions of silts, clays, or fine sands are not acceptable.
  - 3. The pH of the mulch shall be between 5.5 and 8.5.
  - 4. The organic matter content shall be greater than or equal to 25% on a dry weight basis.
- C. Mulch material must be free of refuse, physical contaminants, and material toxic to plant growth. It is not acceptable for the mulch material to contain ground construction debris, biosolids, manure, or recyclable material.
- D. Prior to placement, a representative sample of the mulching material must be tested and certified by the project engineer or his/her designee and accepted by the city inspector.
- E. "Sock" material will be 100% biodegradable, photodegradable, or recyclable such as burlap, twine, UV photodegradable plastic, polyester, or any other acceptable material. The material mesh opening should be equal to or less than 3/8 inch (10 mm) and the material tensile strength should be equal to or greater than 44 psi (3.09 kg/cm2).

#### 648S.4 Installation

- A. Use 12 or 18 inch diameter mulch socks for all sediment control applications. This diameter of mulch sock material has proven to be the most consistent for all sediment control applications (TxDOT, April 2006).
- B. Install mulch socks per Figure 1.4.5.F in the City of Austin Environmental Criteria Manual.

C. Mulch socks should be used at the base of slopes no steeper than 2:1 and should not exceed the maximum spacing criteria provided in the following table.

Slope	Max. Slope Length Between	Max. Drainage Area (sf)
Slope	<u>18 in. Dia. Sock</u> (ft)	per 100ft of Sock
100:1 - 50:1	100	10,000
50:1 - 30:1	75	7,500
30:1 - 25:1	65	6,500
25:1 - 20:1	50	4,800
20:1 - 10:1	25	2,600
10:1 - 5:1	15	1,300
5:1 - 2:1	10	1,000

Slope	Max. Slope Length Between	Max. Drainage Area (sf)
Slope	<u>12 in. Dia. Sock</u> (ft)	per 100ft of Sock
100:1 - 50:1	100	6,000
50:1 - 30:1	40	4,000
30:1 - 25:1	30	3,000
25:1 - 20:1	25	2,600
20:1 - 10:1	15	1,300
10:1 - 5:1	10	1,000
5:1 - 2:1	5	500

- D. Place mulch socks at a 5 ft or greater distance away from the toe of the slopes to maximize space available for sediment deposition.
- E. When placed on level contours, sheet flow of water should be perpendicular to the mulch sock at impact and unconcentrated.
- F. Install mulch socks using rebar (#5 minimum with safety caps) a minimum of 48 inches in length placed on 2-ft centers. In order to prevent the movement or floating of the mulch sock during rain events or construction operations, install steel posts on alternating sides of the sock. Drive the posts into the ground to a minimum depth of 24 inches, leaving less than 12 inches of post above the exposed mulch sock.
- G. In order to prevent water flowing around the ends of the mulch socks, point the ends of the socks up slope.
- H. In order to prevent water from flowing between the gaps at adjacent ends of mulch socks, overlap the ends of adjacent mulch socks a minimum of 12 inches. Never stack mulch socks on top of one another.
- I. Mulch Socks should be placed using 'smiles' and 'j-hooks'. See ECM Section 1.4.5 G (Silt Fence)
- J. For steeper slopes, an additional mulch sock can be constructed on the top of the slope and within the slope area as determined by specific field conditions. Multiple mulch socks are recommended on steeper slopes.

Current Version: August 18, 2010 Previous Versions: new

K. Do not use mulch socks in areas of concentrated flow as they are intended to control sheet flow only.

### 648S.5 Inspection and Maintenance

- A. Inspect mulch socks after installation for gaps under the mulch socks and for gaps between the joints of adjacent ends of mulch socks. Contractor shall repair gaps such that no water flows under or around sock.
- B. Inspect every seven days and within 24 hours of a rainfall event of 0.5 inches or greater. Replace and repair mulch socks as necessary.
- C. Sediment retained by the mulch socks shall be removed when it has reached one third of the exposed height of the mulch socks.
- D. Mulch socks can be vegetated or un-vegetated. Vegetated mulch socks can be left in place. The vegetation will grow in the slope, further anchoring the sock.

### 648S.6 Payment

The work performed and the materials furnished as prescribed by this item shall be paid for by the linear foot of mulch sock installed.

Payment will be made under:

Pay Item No. 648S: Mulch Sock Per Lineal Foot.

**END** 

## **SPECIFIC CROSS REFERENCE MATERIALS**

Specification Item No. 648S, "Mulch Sock"

### City of Austin Environmental Criteria Manual

<u>Designation</u>	<u>Description</u>
1.4.5.F	Mulch Sock
1.4.5.G	Silt Fence

## City of Austin Standard Details

<u>Designation</u> <u>Description</u> 648S-1 Mulch Sock

Item No. 700S Mobilization

### 700S.1 Description

This item shall govern the mobilization of personnel, equipment and materials at the work site for other contract items that will be performed by the Contractor. Mobilization shall include, but not be limited to the movement of equipment, personnel, material, supplies, etc. to the Work site; the installation of temporary facilities (when not paid for separately) and the establishment of office and other necessary facilities prior to the initiation of the Work. The cost of the Payment Bond and Performance Bond on the Work that is delayed due to circumstances beyond Contractor's control, a closed construction season or for the convenience of the City of Austin will be considered part of the mobilization item under this Contract.

#### 700S.2 Measurement.

Measurement of the Specification Item, "Mobilization", as specified herein as "Total Mobilization Payment", will be by the "Lump Sum", as the Work progresses.

#### 700S.3 Payment.

The adjusted contract amount as used below is defined as the original contract amount less the lump sum bid for Mobilization and any payments for materials or equipment not yet incorporated in the Work. The Contractor shall submit a lump sum amount for Payment Item No. 700S-TM, "Total Mobilization Payment".

"Initial Mobilization Payout" as used below is defined as:

- 1. 8% of the original contract amount for projects with an original contract amount of \$ 0.5 million or less; or
- 2. 4% of the original contract amount for projects with an original contract amount greater than \$ 0.5 million.

In those instances where the "Initial Mobilization Payout", as defined above, exceeds the "Total Mobilization Payment" lump sum bid item (i.e. Payment Item No. 700S-TM), the "Total Mobilization Payment" shall be used as the "Initial Mobilization Payout". In no instance shall the "Initial Mobilization Payout" exceed the "Total Mobilization Payment" bid item.

Partial payments of the "Initial Mobilization Payout" shall be as follows:

- A. Upon presentation of a paid invoice for the Payment Bond, Performance Bond and/or required insurance, the Contractor will be paid that cost from the amount bid for "Total Mobilization Payment".
- B. The Mobilization of tunnel boring machines, batch plants or other similar facilities, along with supporting materials and equipment, to the work site or to the vicinity of the Work site will be considered as partial Mobilization under this contract. The Contractor shall provide a certified statement of the Contractor's

expenditure for the Mobilization and setup of the facility and supporting equipment. Upon approval by the Engineer or designated representative, the certified expenditure will be paid from the amount bid for the Specification Item, "Total Mobilization Payment". In no case shall the combined amount for all of these facilities be more than 10 percent of the Mobilization "Total Mobilization Payment" lump sum bid or one (1) percent of the total contract amount, whichever is less.

- C. When one (1) percent of the adjusted contract amount is earned, 50 percent of the "Initial Mobilization Payout" will be paid. Previous payments under this item will be deducted from this amount.
- D. When five (5) percent of the adjusted contract amount is earned, seventy-five (75) of the "Initial Mobilization Payout" will be paid. Previous payments under this item will be deducted from this amount.
- E. When ten (10) percent of the adjusted contract amount is earned, one hundred (100) percent of the "Initial Mobilization Payout" will be paid. Previous payments under this item will be deducted from this amount.
- F. Payment for the remainder of Pay Item No. 700S-TM, "Total Mobilization Payment" will be made upon receipt of the final pay estimate.

Payment will be made under:

Pay Item No. 700S-TM: "Total Mobilization Payment" Lump Sum

#### **END**

<b>RELATED</b> CROSS REFERENCE MATERIALS	
Specification 700S, "MOBILIZATION"	

#### City of Austin Standard Contract Documents Designation Description 00020 Invitation for Bids 00100 Instructions To Bidders 00300 Bid Form 00425 Insurance Cost Form 00500 Agreement 00610 Performance Bond 00620 Bid Bond Certificate of Insurance 00650 00700 **General Conditions** 00810 Supplemental General Conditions Modifications to Bidding Requirements & Contract Forms 00820 01010 Summary of Work Submittals 01300 01500 Temporary Facilities Public Safety and Convenience 01550 Contract Closeout 01700 01710 Final Cleaning

Previous Versions: 06/16/08, 05/20/02

and 09/30/87

Item No. 701S

## **Fencing**

### 701S.1 Description

This item shall govern furnishing and installing fencing and gates at locations shown on the Drawings or directed by the Engineer or designated representative, including all posts, bracing and accessories as specified in this Item and as indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text inch-pound units are given preference followed by SI units shown within parentheses.

#### 701S.2 Submittals

Prior to installation of the fencing the Contractor shall furnish the Engineer or designated representative with certification from the manufacturer that all fencing materials comply with the requirements specified in this Item.

#### 701S.3 Materials

#### A. Chain Link Fabric

- 1. Wire fabric for fencing shall be 9 gauge (3.76 mm) steel with a minimum breaking strength of 1,290 pounds per foot (1 750 Newtons per square meter). The overall height of the fence when erected shall be the height above grade as indicated on the Drawings. The fabric shall be woven into an approximately 2-inch ± 1/8-inch (50 mm ± 3 mm) mesh such that in a vertical dimension of 23 inches (585 mm) along the diagonals of the openings there shall be at least 7 meshes. Unless indicated otherwise on the Drawings the fabric shall have a knuckled (K) and twisted (T) finish for the top and bottom selvages respectively. The wire in the fabric shall withstand a minimum tensile strength test of 75,000 psi (517 kPa) after galvanizing. Except as provided herein, the chain link fence fabric shall conform to ASTM A392, Class I or ASTM A491.
- 2. The fabric shall be hot dip galvanized after weaving and shall have a minimum coating of 1.2 ounces per square foot (0.4 kilograms per square meter) of uncoated surface conforming to ASTM A392, Class I.
- 3. Between posts the fabric shall be fastened at 12-inch (300-mm) intervals to a top and bottom tension wire. When a top rail is shown on the Drawings, the fabric shall also be fashioned in the same manner. On gate frames, the fabric shall be fastened to top and bottom of the gate frame at all 12-inch (300-mm) intervals. Steel or aluminum wire fabric ties with a minimum 9 gauge (3.76 mm) diameter shall be used.

#### B. Woven Wire Fencing

Woven wire fencing shall be either galvanized steel wire fencing or aluminum-coated steel wire fencing conforming to the following requirements:

1. Galvanized steel wire fencing shall conform to ASTM A116, Class 1.

2. Aluminum-coated steel wire fencing shall consist of aluminum-coated steel wire conforming to the requirement for galvanized steel wire fencing, except the wire shall be aluminum coated. The wire shall not have less than 0.40 ounce (11 grams) coating of aluminum alloy per square foot of uncoated surface in accordance with ASTM A491

### C. Wire Fencing

Wire shall be either galvanized or aluminum alloy coated 9 gage (3.76 mm) steel wire conforming to the specifications for galvanized steel or aluminum alloy coated woven wire fencing above.

### D. Wood Fencing

Wood for wood fencing shall be Wolmanized pine, cedar or as indicated on the Drawings. The timber shall be sound and free from all decay, shakes, splits or any other defects, which would make it structurally unsuitable for the intended purpose.

### E. Metal Posts, Top Rails, Braces and Gates

Steel pipe used for posts, top rails, braces and gate frames shall conform to the specifications of ASTM A 53. Steel sections used for posts, top rails, frames and braces shall be a good commercial quality weldable steel. All material shall be new and no used, re-rolled or open seam material will be acceptable. All posts shall meet the weight and length requirements indicated. The fabric bands and steel wire ties shall conform to the gauge and spacing indicated and shall be of suitable design to fasten fabric to the posts. Wire ties of the gauge shown may be used in lieu of fabric bands. All fittings required for posts shall be pressed or rolled steel, forge steel, malleable iron or wrought iron of good commercial quality and spaced as indicated on the Drawings.

#### 1. Line Posts

Line posts may be either C-section or tubular. Tubular line posts shall be fitted with watertight malleable iron caps. Line posts shall be furnished in sufficient quantity to provide a maximum spacing of 10 feet (3 meters)

#### 2. Terminal Posts

All end, corner and pull posts shall be known as terminal posts and shall be of either round or square sections. All terminal posts shall be furnished with watertight malleable iron caps. Fabric shall be fastened to terminal posts by steel stretcher bars and stretcher bar bands fitted with carriage bolts and nuts of the size and spacing indicated on the Drawings.

#### 3. Gate Posts

Gateposts shall be either round or square. All gateposts shall be furnished with watertight malleable iron caps. The fabric shall be attached to the gateposts by means of steel stretcher bars and stretcher bar bands fitted with carriage bolts and nuts of the size and spacing indicated on the Drawings.

#### 4. Post Caps

Post caps for pipe sections shall be designed to exclude all moisture. Where a top rail is shown on the Drawings, post caps shall have an opening for the top rail. All post caps shall have a 2-inch (50-mm) skirt for rigidity. When barbed wire is allowed for topping a six-foot (1.82 meter) or higher fence (LDC Section 10-1-9) the barbed wire support arms shall be integral with post caps.

### 5. Gates

#### a. Single Swing Gate

The gate frames shall be fabricated from sections either round or square of the size and weight indicated on the Drawings and shall be filled out with the same type fabric specified for the chain link fence. All gates shall be equipped with approved malleable iron or steel latches, stops and center rest. A satisfactory locking device suitable for padlocking shall be provided. The gates shall be hung by at least 2 steel or malleable iron hinges securely fastened to the posts. Hinges shall not twist or turn under the action of the gate, shall be capable of allowing a full 180 degree opening turn, shall be so arranged that a closed gate cannot be lifted off the hinges to obtain entry and shall be easily operated by one person.

#### b. Double Swing Gate

Double Swing gates shall be furnished and installed as indicated on the drawings. Gates shall be of the same height as the fence and shall have a single vertical mat of barbed wire. The gates shall be hinged to swing 180 degrees from closed to open. The gates shall be complete with frames, latches, stops, keepers, hinges, fabric, braces, padlocks and three strands of barbed wire. Gates shall have intermediate members and diagonal truss rods as required for rigid construction and shall be free from sag and twist. Gates shall be fitted with vertical extension arms or shall have frame end members intended to carry barbed wire.

Hinges shall be pinned type, heavy pattern with large bearing surface and shall not twist or turn under the action of gate. Latches for double swing gates shall be plunger bar type, full gate height, and arranged to engage the gate stop. Stops shall consist of a roadway plate with anchor set in Portland Cement concrete and arranged to engage the plunger. Keepers shall consist of mechanical devices for securing and supporting the free end when in the full open position. Latches shall be arranged for padlocking with padlock accessible from sides of the gate. Gates shall be installed so that they cannot be removed without disassembly of the hardware. Hardware attachment bolt shall be penned to prevent easy removal.

#### 6. Top Rail

The top rail shall be of size and weight indicated on the Drawings and shall be furnished in random lengths, not less than 18 feet (5.5 meters) per section with outside sleeve type couplings at least 6 inches (150 mm) long and having a wall thickness of not less than 0.70-inch (18-mm). One coupling in five shall have a heavy spring to take up expansion and contraction of the rail. The top rail shall be installed before installing chain link fabric and shall pass through post tops.

#### 7. Braces

All braces shall be of the size, weight and length indicated on the Drawings. All braces shall be trussed with rods and turnbuckles of the dimensions indicated on the Drawings. Braces shall be installed on all terminal posts and shall extend to the adjacent line posts. All corner and pull posts shall have braces on each side of terminal.

#### 8. Fittings, Bolts and Other Miscellaneous Hardware

All fittings, bolts and miscellaneous hardware shall be hot dip galvanized in conformance with TxDoT Standard Specification Item No. 445, "Galvanizing.

#### 9. Tension Wire

Between posts, the fabric shall be fastened to a top and bottom tension wire or to the top rail and bottom tension wire by steel wire ties of the gauge and spacing indicated on the

Drawings. The tension wire shall be at least 7 gauge (4.5 mm) galvanized coil spring steel of good commercial quality.

Tension wire shall have a minimum coating of 0.8 ounce per square foot (0.2 kilogram per square meter) of uncoated surface when tested in conformance with ASTM A116.

### 10. Security Fence

The security fence shall be 8 feet (2.44 meters) high with brackets and 3 strands barbed wire.

Barbed wire, when specified on the Drawings, shall be 12-1/2 gauge wire (2.51 mm), twisted with two-point 14 gauge (2.03 mm) barbs spaced approximately 5 inches (125 mm) apart and shall conform to ASTM A121 or ASTM A585. Three strands of barbed wire will be required when a barbed wire top is specified on the Drawings.

Barbed wire support arms shall be at an angle or 45° from vertical and shall have clips for attaching three (3) strands of barbed wire to each support arm. Each support arm shall be of sufficient strength to support a 200-pound (90 kilograms) weight (mass) applied at the outer strand of barbed wire.

### 11. Galvanizing

Thin-wall, high-strength pipe posts shall be externally hot-dip galvanized with a minimum weight of coating of 0.9 ounce per square foot (0.3 kilogram per square meter). After galvanizing, thin-wall, high-strength pipe posts shall be externally chromated by total immersion followed by application of clear polyurethane finish.

Interior surfaces shall have a hot-dip galvanized coating, a zinc base coating with thickness 0.5 mil  $\pm$  0.2 mil (13 micrometer  $\pm$  5 micrometer). The coating shall be 94 percent zinc powder by weight (mass).

All tubular posts, rails and braces shall comply with the following salt spray performance requirements when tested in accordance with ASTM B117.

Exterior – 1250 hours to maximum 5 % red rust Interior – 650 hours to maximum 5 % red rust

The uniformity of the zinc coating shall be determined by visual inspection. If, in the opinion of the Engineer or designated representative, visual examination is not conclusive, he may use the Preece Test as described in ASTM A239. When so tested, all items shall withstand a minimum of 6 one-minute dips except for those items designated in ASTM A153 as Class B-2, B-3, C and D, which shall withstand a minimum of 4 one-minute dips.

Careful visual inspection shall be made to determine the quality of the zinc coating. Excessive roughness, blisters, salammoniac spots, bruises and flaking if present to any considerable extent, shall provide a basis for rejection. Where practicable, all inspection and tests shall be made at the place of manufacturer prior to shipment and shall be so conducted as not to interfere unnecessarily with the progress of the work.

Damaged spelter coating shall be repaired by thoroughly wire brushing the damaged area and removing all loose, cracked or weld-burner spelter coating. The cleaned area shall be painted with 2 coats of zinc oxide-zinc dust paint conforming to the requirements of Federal Specification TT-P-641B. The paint shall be furnished at the Contractor's expense.

Previous Versions: 06/16/08, 05/20/02

and 09/30/87

### F. Concrete Post Anchorages

Concrete for post footings, catch blocks, anchors and other such items related to the fence construction, shall be Class B Concrete conforming to Item No. 403S, "Concrete for Structures" or as indicated on the Drawings. Maximum size of aggregate shall be 3/4 inch (19 mm). Hand mixing of concrete will be permitted on batches under 1/2 cubic yard (0.38 cubic meter). All batches exceeding this volume will be machine mixed.

Concrete shall be placed promptly and without segregation after mixing. The Contractor shall consolidate the concrete satisfactorily by tamping or vibrating. Excess excavation from footings shall be satisfactorily disposed of.

The tops of post footings shall extend slightly above ground and shall be steel troweled to a smooth finish sloped to drain away from posts. Posts, braces and other units shall be centered in footings.

### G. Mowing Strip

When called out in the drawings, a mowing strip shall be Class A concrete. It shall be 24 inches (610 mm) wide and a minimum of 4 inches (100 mm) thick. Three (3) number (#3) bars shall be evenly spaced and supported along the full length of the mow strip, and a number 3 (#3) bar shall be cross-tied every 4 feet (1.2 m). Fence posts shall be installed in center of mow strip.

### 701S.4 Inspection and Sampling

The Contractor shall furnish, upon request of the Engineer or designated representative, samples of each component part of the fence including fittings. These samples shall be subjected to the galvanizing, weight and where required, strength tests. A sample may be taken for each project or for each shipment to a project, when requested by the Engineer or designated representative. All samples shall be furnished to the City free of charge.

If any specimen tested fails to meet the requirements of this specification, two (2) additional specimens shall be cut from the remainder of the sample and tested, both of which shall meet the requirements in every respect or the lot represented by the sample may be rejected.

#### 701S.5 Construction Methods

The Chain Link Fence shall be erected to lines and grades established by the Engineer or designated representative in accordance with the details indicated on the Drawings. The fence shall be true to line, taut and shall comply with the best practice for fence construction of this type.

### A. Clearing and Grading

The Contractor shall perform all clearing of brush, rocks and debris necessary for the installation of this fencing.

#### B. Erection of Posts

Posts shall be set plumb and permanently positioned and anchorages firmly set before fabric is placed. Posts shall be set in concrete, unless otherwise indicated on the Drawings.

Concrete footings shall be carried to the depth and dimensions indicated on the Drawings. Where rock is encountered within the required depth to which the post is to be erected, a hole of a diameter slightly larger than the largest dimension of the post may be drilled into the rock and the post grouted in. The regular dimensioned concrete footing as indicated on the Drawings shall then be placed between the top of the rock and required grade indicated on the Drawings. Posts shall be approximately centered in their footings. All concrete shall be placed promptly and compacted by tamping or other approved methods. Concrete shall be finished in a dome and shall be cured a minimum of 48 hours before further work is done on the posts.

Pull posts shall be placed not over 500 feet (15.25 meters) apart in straight runs and at each vertical angle point, all as directed by the Engineer or designated representative. Corner posts shall be placed at each horizontal angle point greater than 15 degrees. Corner and pull posts shall have horizontal braces and tie rods as specified above and as indicated or designated representative.

### C. Erection of Top Rail and Tension Wire

The top rail and bottom tension wire and/or top and bottom tension wires shall be installed before installing the chain link fabric. The top rail shall be firmly attached in final position. Tension wires shall be within 4 inches (100 mm) of the top and bottom of the fabric and shall be pulled taut.

#### D. Erection of Fabric

After all posts have been permanently positioned and anchorages firmly set with the cables drawn taut with the turnbuckles, the fabric shall be placed by securing one end and applying sufficient tension to the other end to remove all slack before making attachments. Unless otherwise indicated on the Drawings, the fabric shall be cut and each span shall be attached independently at all corner posts and pull posts.

Fabric shall be fastened as indicated on the Drawings and the bottom of the fabric shall be placed a normal distance of 2 inches (50 mm) above the ground line; however, over irregular ground this distance may vary between 1 inch (25 mm) and 6 inches (150 mm) for a distance not to exceed 8 feet (2.44 meters). Any necessary backfilling required, in order to comply with these provisions, will be considered as incidental work.

#### E. Fence Grounding

This fence shall be grounded where a power line passes over the fence. In any case, a ground shall be provided at locations not to exceed 1,000 feet (30 meters) apart in straight runs of fence. Each individual section of fence shall have at least 1 ground. The ground shall consist of a copper-weld rod 8 feet (2.44 meters) long and a minimum of 5/8 inch (16 mm) in diameter driven or drilled in vertically until the top of the rod is approximately 6 inches (150 mm) below the top of the ground. A No. 6 solid copper conductor shall be brazed to the rod and to the fence in such a manner that each element of the fence is grounded.

### F. Erection of Wood Fencing Material

After all posts have been permanently positioned and anchorages firmly set, stringers shall be placed and boards secured to the stringers. Other techniques utilizing modular precut panels may be used, when indicated on the Drawings.

#### 701S.6 Measurement

Chain Link Fence, of each height specified, will be measured by the lineal foot of fence measured at the bottom of the fabric along the centerline of fence from center to center of terminal posts, excluding gates. Gates will be measured as each gate, complete in place.

### 701S.7 Payment

The work performed and material furnished as prescribed by this item, measured as provided under "Measurement" will be paid for at the unit bid price for "Chain Link Fence" of the height specified. The unit bid price shall include full compensation for furnishing and installing all fencing materials (except gates) including all miscellaneous fittings, braces, post caps, line wires, connection clips or wires; digging post holes and grouting in rock where required; furnishing and placing concrete for setting posts; furnishing and installing all electrical grounds; all hauling and handling charges; and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work, including excavation, backfilling and disposal of surplus material.

Gates measured as provided under "Measurement" will be paid for at the unit bid price for "Pedestrian Gate" or "Vehicular Gate", of the type, height and opening specified. The unit bid price shall include full compensation for furnishing all materials; fabricating, preparation, hauling, handling charges and erecting, including all miscellaneous fittings, braces, latches, gate hinges, stops and center anchorage; and for all manipulations, labor, tools, equipment and incidentals necessary for complete installation.

Payment will be made under one of the following:

Chain Link Fence, -	Per Lineal Foot
Chain Link Pedestrian Single Swing Gate,Foot	. xFoot.
	Per Each
Chain Link Pedestrian Double Swing Gate,Foo	ot. xFoot.
	Per Each
Chain Link Vehicular Single Swing Gate,Foo	ot. xFoot.
	Per Each
Chain Link Vehicular Double Swing Gate,Foot	. xFoot.
-	Per Each
Wire Fence	Per Lineal Foot
Wood Fence	Per Lineal Foot
Wood Fence Pedestrian Gate,Foot. xFoot	. Per Each
Wood Fence Vehicular Gate,Foot. xFoot.	Per Each
Security Fence,Foot, High Type	Per Lineal Foot
Temporary Fence,Foot High,Type	Per Lineal Foot
: Mowing Strip	Per Lineal Foot
	Chain Link Pedestrian Single Swing Gate,Foot Chain Link Pedestrian Double Swing Gate,Foot Chain Link Vehicular Single Swing Gate,Foot Chain Link Vehicular Double Swing Gate,Foot Wire Fence Wood Fence Wood Fence Pedestrian Gate,Foot. xFoot Wood Fence Vehicular Gate,Foot. xFoot. Security Fence,Foot, High Type Temporary Fence,Foot High,Type

### End

### **SPECIFIC** CROSS REFERENCE MATERIALS

City of Austin Standard Specifications

Designation Description

Item No. 403S Concrete for Structures

Previous Versions: 06/16/08, 05/20/02

and 09/30/87

City of Austin Code of Ordinances, Volume I

<u>Designation</u> <u>Description</u>

Section 10-1-9 Barbed Wire Fences

Texas Department of Transportation: Standard Specifications

For Construction of Highways, Streets and Bridges

<u>Designation</u> <u>Description</u> Item No. 445 <u>Galvanizing</u>

American Society For Testing And Materials (ASTM)

<u>Designation</u> <u>Description</u>

A 53/A 53M Specification For Pipe, Steel, Black and Hot-Dipped, Zinc-Coated,

Welded and Seamless

A 116 Specification For Zinc-Coated (Galvanized) Steel Woven Wire Fence

Fabric

A 121 Specification For Zinc-Coated (Galvanized) Steel Barbed Wire

A 153/A 153M Specification For Zinc-Coated (Hot-Dip) on Iron and Steel Hardware Practice for Locating the Thinnest Spot in a Zinc (Galvanized)

Coating on Iron and Steel Articles

A 392 Specification For Zinc-Coated Steel Chain-Link Fence Fabric

A 491 Specification For Aluminum-Coated Steel Chain-Link Fence Fabric

A 585 Specification For Aluminum-Coated Steel Barbed Wire B 117 Practice for Operating Salt Spray (Fog) Apparatus

Federal Specification TT-P-641B

### **RELATED** CROSS REFERENCE MATERIALS

<u>Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges</u>

<u>Designation</u>
Item No. 550
Item No. 552

Description
Chain Link Fence
Wire Fence

Item No. 802S Project Signs

### 802S.1 Description

This item shall govern furnishing, fabricating, erecting, maintaining and removing Project Signs on Capital Improvement Projects (C.I.P.), Bond Program Projects and for project identification at other construction sites, when required on the Drawings. The C.I.P. signs shall be constructed in accordance with Standards 802S-1, 802S-1A, 802S-2, 802S-2A, 802S-2B and 804S-5 or as indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 802S.2 Materials

#### A. Sign Face

Sign face shall be manufactured on standard exterior waterproof plywood sheets or other suitable material approved by the Engineer or designated representative. Unless indicated otherwise on the Standard Details or Drawings, the thickness of the plywood sheet shall be a minimum of ¾ inches (19 mm).

#### B. Posts

Lumber posts, of the size indicated on the Standard Details or on the Drawings, shall be pressure treated with pentachlorophenol.

#### C. Paint

Exterior oil base paint, colors as indicated on the Standard Details or on the Drawings.

D. Decals for Capital Improvement Projects and Bond Program Projects

City seal shall be in color using the 4 color process. Electronic images, in EPS format, are available from the Public Works Website (http://www.ci.austin.tx.us/publicworks/techspecs.htm) for downloading.

### 802S.3 Installation

The signs shall be erected at each major entrance to the project for maximum public identification and exposure. At locations where construction is confined to a specific area, the installed sign size shall be  $4 \times 8$  foot (1.2  $\times 2.4$  meter). At locations where C.I.P. roadway construction is in progress, such as a street paving or construction of a sidewalk, the sign shall be  $2 \times 3$  foot (0.2  $\times 0.8$  meter). Signs for Bond Program Projects shall be  $3 \times 4$  foot (0.9  $\times 1.2$  meters).

The signs shall be posted on portable wood frames or stanchions and will be located in the proximity of the work area as construction progresses. All lumber shall be painted with 2 coats of paint as indicated herein, on the Standard Details or in the Drawings.

In special cases the size of the sign may be changed to meet special requirements, but general proportions shall be maintained.

802S 09/26/12 Page 1 Project Signs

It shall be the responsibility of the Contractor to maintain and relocate signs, if necessary during the progression of the project. Care shall be exercised to assure that placement of the signs does not interfere with or cause sight obstruction to vehicular and pedestrian traffic.

For projects located on a street with curb and gutter, signs shall be installed no closer than 2 feet (0.6 meter) from the face of curb on the street.

For projects located on a street without curb and gutter, signs shall be installed no closer than 6 feet (1.8 meters) from the edge of street pavement.

The Contractor may install, at the Contractor's own expense, company signs to identify the Contractor, architectural firm, etc. Signs are to be securely attached to the posts at locations indicated on the Drawings and shall not be larger than  $18 \times 36$  inches  $(0.45 \times 0.90 \text{ meter})$ .

#### 802S.4 Measurement

The CIP contract and/or Bond Program, signs shall be measured by either lump sum or per each.

#### 802S.5 Payment

The work performed and the materials furnished as prescribed by this item shall be paid for by lump sum or per each price bid only. The 'lump sum' bid or 'per each' price bid shall include full compensation for all work performed and all materials furnished in constructing, transporting, maintaining and removing the signs as specified on the Drawings and as directed by the Engineer or designated representative.

Payment will be made under one of the following:

Pay Item No. 802S-A C.I.P.: C.I.P. Project Signs	Lump Sum.
Pay Item No. 802S-B C.I.P.: C.I.P. Project Sign	Per Each.
Pay Item No. 802S-A BOND: Bond Project Signs	Lump Sum.
Pay Item No. 802S-B BOND: Bond Project Sign	Per Each.

#### End

<u>SPECIFIC</u> CROSS REFERENCE MATERIALS	
Specification Item No. 802S, "Project Signs"	

#### City of Austin Standard Details Designation Description Item No. 802S-1 2.4 m x 1.2 m (8'x4') C. I. P. Building Project Sign Item No. 802S-1A 2.4 m x 1.2 m (8'x4')Bond Program Building Project Sign 600 mm x 900 mm (24" x 36")C. I. P. Movable Item No. 802S-2 Sign Type II Item No. 802S-2A 600 mm x 900 mm (24" x 36") Joint C. I. P. Movable Sign Type II Item No. 802S-2B 900 mm x1.2 m (36" x 48") Bond Program Project Movable Sign Item No. 804S-5 Typical CMTA / C.I.P. Sign Locations

802S 09/26/12 Page 2 Project Signs

Current Version: November 15, 2011

Previous Versions: 06/21/07, 02/17/04, 11/26/01, 02/21/01, 05/23/00 and 09/30/87

Item No. 803S Barricades, Signs and Traffic Handling

### 803S.1 Description

This item shall govern for providing, installing, moving, replacing, maintaining, cleaning and removing upon completion of the work, all temporary or permanent street closure barricades, signs, cones, lights or other devices required to handle the traffic in conformance with the current edition of the Texas Manual of Uniform Traffic Control Devices for Street and Highways and as indicated on the Drawings or directed by the Engineer or designated representative.

Constructing A Detour, if required, shall conform to Standard Specification Item No. 801S, "Constructing A Detour". Capital Improvement Project Signs shall conform to Standard Specification Item No. 802S, "Project Signs".

This item shall also include the installation of all required safety fencing as described in the latest adopted version of Standard Detail 804S-4.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 803S.2 Submittals

The submittal requirements of this specification item include:

- A. Type of Barricade and proposed materials and Construction of the barricade,
- B. Test results for Retro-Reflective sheeting.

#### 803S.3 Materials

All barricades, signs, cones, lights and other types of devices to handle traffic, as indicated on the Drawings or directed by the Engineer or designated representative, shall conform to details shown on the Drawings or those indicated in the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

#### **803S.4 Construction Methods**

Prior to commencement of construction, suitable "Barricades, Signs and Traffic Handling" devices shall be installed to protect the workers and the public.

The Contractor shall be responsible for the installation of all markers, signs and barricades in accordance with the Drawings and in conformance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and/or as indicated on the Drawings or directed by the Engineer or designated representative. If, in the opinion of the Engineer or designated representative, additional markers, signs or barricades are needed in the interest of safety, the Contractor will install such as are required or as directed by the Engineer or designated representative. All changes and/or revisions to the detour/traffic control plan shall be approved by the Engineer or designated representative.

Lumber shall be painted with 2 coats of paint as indicated on the Drawings.

#### 803S.5 Maintenance

It shall be the Contractor's responsibility to maintain, clean, move and replace if necessary, barricades, signs and traffic handling devices during the time required for construction of the project. Permanent barricades shall be constructed as required after the completion of the street by drilling holes to place the posts and concrete foundations. Foundation concrete shall be cured before the rails are attached. When no longer needed, all temporary Barricades, Signs and Traffic Handling Devices shall be removed and the area restored to its original condition or as directed by the Engineer or designated representative.

#### 803S.6 Measurement

The work performed and material furnished as prescribed by this item, City of Austin Standard Details, details included on the Drawings or indicated in the TMUTCD shall be measured as follows:

#### A. Pavement Markings.

All pavement marking required for proper installation of the designated Traffic Control Plans and Details, as well as required removal of existing pavement marking, shall be measured and paid for under Standard Specification Item No. 870S, "Work Zone Pavement Markings" and Standard Specification Item No. 874S, "Eliminating Existing Pavement Markings".

#### B. Barricades, Signs and Traffic Handling.

All work performed and material furnished as prescribed by this item, City of Austin Standard Details, details shown on the Drawings or indicated in the TMUTCD, that are not included in the above paragraph, shall be measured by the number of calendar days, working days or months of actual service.

Traffic control for the project will be measured and paid for once per contract defined time period, i.e. either per Calendar Day, Working day or Month at the contract rate, regardless of the number of set-ups, locations or streets under construction.

#### C. Safety Fencing

Safety fencing will be measured by the lineal foot.

#### 803S.7 Payment

The work performed and materials furnished as prescribed by this item, measured as provided under section "803S.6 Measurement" shall be paid for at the contract unit price for barricades, signs and traffic handling. This unit price shall include full compensation for furnishing. placement and removal of all materials and for all labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item No. 803S -CD: Barricades, Signs, and Traffic Handling Per Calendar Day. Pay Item No. 803S-WD: Barricades, Signs, and Traffic Handling Per Working Day. Barricades, Signs, and Traffic Handling Per Month. Pay Item No. 803S-MO: Pay Item No. 803S-SF: Safety Fence Per Lineal Foot.

End

**SPECIFIC CROSS REFERENCE MATERIALS** 

Specification Item No. 803S, "Barricades, Signs and Traffic Handling"

City of Austin Standard Specifications

Designation Description

Item No. 801S Constructing A Detour

Item No. 802S **Project Signs** 

Work Zone Pavement Markings Item No. 870S

Eliminating Existing Pavement Markings and Markers Item No. 874S

Texas Technical Documents:

Designation Description

(TMUTCD) Texas Manual on Uniform Traffic Control Devices

**RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 803S, "Barricades, Signs and Traffic Handling"

City of Austin Standard Specifications

Designation Description

Item No. 403S Concrete for Structures

Item No. 860S Pavement Marking Paint (Reflectorized)

Reflectorized Pavement Markers Item No. 863S Item No. 864S Abbreviated Pavement Markings

**Epoxy Adhesive** Item No. 867S

Reflectorized Pavement Markings Item No. 871S

Item No. 875S Pavement Surface Preparation For Markings

City of Austin Standard Details

Designation Description

803S-1 Street-End Barricades

Texas Department of Transportation: Standard Specifications for Construction and

Maintenance of Highways, Streets, and Bridges

Designation Description

Item No. 502 Barricades, Signs and Traffic Handling

Item No. 508 **Constructing Detours** One-Way Traffic Control Item No. 510

Portable Concrete Traffic Barrier Item No. 512 Permanent Concrete Traffic Barrier Item No. 514 Item No. 662 Work Zone Pavement Markings Item No. 666 Reflectorized Pavement Markings Item No. 667 Prefabricated Pavement Markings

Item No. 672 Raised Pavement Markers

Item No. 677 Eliminating Existing Pavement Markings and Markers

Item No. 678 Pavement Surface Preparation For Markings

# Item No. 862S Temporary Removable Pavement Markings

### 862S.1 Description

This item shall govern furnishing, placement and removal of prefabricated removable pavement markings of the types, colors, shapes and sizes indicated on the Drawings or as directed by the Engineer or designated representative.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 862S.2 Submittals

The submittal requirements of this specification item include:

- A. List of temporary, removable, pavement markings, shapes, words, etc. with associated manufacturer.
- B. Manufacturer's recommended preparation, cleaning, placement and installation instructions.
- C. Type of adhesive and application recommendations.

#### 861S.3 Materials

The prefabricated pavement marking materials shall conform to TxDOT Departmental Material Specification DMS-8240. The materials shall be stored in a weatherproof enclosure in such a method that will prevent damage.

### 862S.4 Sampling

Sampling will be conducted in accordance with TxDOT Test method Tex-732-1.

### 862S.5 Construction Methods

#### A. General

Guides to mark the lateral location of pavement markings shall be established as indicated on the Drawings or as directed by the Engineer or designated representative. The Contractor shall establish the pavement marking guides and the Engineer or designated representative will verify the location of the guides prior to installation of final striping.

The pavement markings shall be placed in proper alignment with the guides. The deviation rate in alignment shall not exceed one (1) inch per 200 feet (25 mm in 60 meters) of roadway. The maximum deviation shall not exceed two (2) inches (50 mm) nor shall any deviation be abrupt.

#### B. Seasonal Limitation

Unless directed otherwise in writing by the Engineer or designated representative, temporary pavement marking materials shall not be placed between September 30 and March 1, subject to any specified temperature and moisture limitations.

#### C. Dimensions

Markings shall be in accordance with the color, length, width, shape and configuration indicated on the Drawings. The alignment and location shall be as indicated on the Drawings or as directed in writing by the Engineer or designated representative.

#### D. Methods

All material placement shall be in accordance with the material manufacturer's instructions. unless otherwise directed in writing by the Engineer or designated representative. In addition to the manufacturer's instructions, material placement shall be in accordance with surface condition, moisture and temperature requirements specified within this item.

#### E. Surface Preparation

Surface preparation shall be accomplished by any cleaning method, approved by the Engineer or designated representative, that effectively removes contaminants and loose materials and corrects existing conditions considered deleterious to proper adhesion. Surface preparation utilizing blast cleaning will only be required if indicated on the Drawings.

Surfaces shall be further prepared after cleaning by sealing or priming, as recommended by the manufacturer of the temporary pavement marking materials or as directed in writing by the Engineer or designated representative.

Adhesive, when required, shall be of the type and quality recommended by the manufacturer of the temporary pavement marking material. Portland cement concrete pavement surfaces shall not be cleaned by grinding.

#### F. Moisture

The pavement surface on which the marking material is to be placed shall be completely dry. A pavement shall be considered dry, if on a sunny day after observation for 15 minutes, condensation does not develop on the underside of a one (1) foot (300 mm) square piece of clear plastic, which has been placed on the pavement and weighted down on the edges.

#### G. Temperature

The pavement and ambient air temperature requirements, which are recommended by the material manufacturer, shall be followed. If no temperature requirements are established by the material manufacturer, the material shall not be placed if the pavement surface temperature is below 50°F (10°C) or above 130°F (55°C).

#### 862S.6 Performance Requirements

#### A. Adhesion

Installed pavement markings shall not lift, shift, smear, spread, flow or tear by traffic action.

### B. Appearance

Pavement markings shall present a neat, uniform appearance, free of excessive adhesive, ragged edges and irregular lines or contours.

#### C. Visibility

Installed pavement markings shall have uniform and distinctive retroreflectance when observed in accordance with TxDOT Test Method Tex-828-B.

#### D. Observation Period

The Contractor shall be responsible for maintaining at its own expense all temporary pavement markings from the time of installation until completion and acceptance of the Work in accordance with this Item and to the satisfaction of the Engineer or designated representative. Pavement markings, that fail to meet the requirements of this specification shall be removed and replaced by the Contractor at the Contractor's expense.

#### 862S.7 Measurement

Measurement of the markings shall be made for each color by the lineal foot (lineal meter: 1 meter is equal to 3.281 feet) of the various widths; by each for word(s), shape or symbol or by any other unit as indicated on the Drawings, complete in place.

#### 862S.8 Payment

The work performed and materials furnished as prescribed by this item and measured as provided under "Measurement," will be paid for at the unit bid price for "Temporary Removable Pavement Markings" of the various types, colors, shapes and sizes indicated on the Drawings. This price shall include full compensation for: cleaning the pavement surface by any suitable means other than blast cleaning; for furnishing, placing and removal of all materials; and for all labor, tools, equipment and incidentals necessary to complete the work.

Payment for Temporary Removable Pavement Markings will be made under the following:

Pay Item No. 862S-4Y:	4" yellow Markings,	Per Lineal Foot.
Pay Item No. 862S-24W:	24" yellow Markings,	Per Lineal Foot.
Pay Item No. 862S-TSH:	Shape(s) of color	Per Each.
Pay Item No. 862S-TSY	Symbol(s) of color	Per Each.
Pay Item No. 862S-TW:	Word(s) of color	Per Each.

**END** 

### **SPECIFIC CROSS REFERENCE MATERIALS**

Specification Item 862S "Temporary Removable Pavement Markings"

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u> <u>Description</u>

Tex-732-I Sampling of Prefabricated Pavement Marking Materials

Tex-828-B Determining Functional Characteristics of Pavement Markings

Texas Department of Transportation: Departmental Materials Specifications

<u>Designation</u> <u>Description</u>

DMS-8240 Temporary Marking Material

City of Austin Transportation Criteria Manual Designation Description

Section 8 Traffic Control

State of Texas Manual on Uniform Traffic Control Devices for Streets and Highways

<u>Designation</u> <u>Description</u>
Part III <u>Markings</u>

Part VI Traffic Controls for Street and Highway Construction, Maintenance,

Utility and Incident Management Operations

Part VI, Article D Markings

Part VI, Article F Control of Traffic Through Work Areas

### **RELATED** CROSS REFERENCE MATERIALS

Specification Item 862S "Temporary Removable Pavement Markings"

### City of Austin Standard Specifications

<u>Designation</u> <u>Description</u>
Item No. 867S <u>Epoxy Adhesive</u>

Item No. 870S Work Zone Pavement Markings

Item No. 874S Eliminating Existing Pavement Markings and Markers

Item No. 875S Pavement Surface Preparation For Markings

#### Texas Department of Transportation: Standard Specifications for Construction

and Maintenance of Highways, Streets, and Bridges

Designation Description

Item No. 662 Work Zone Pavement Markings

Item No. 677 Eliminating Existing Pavement Markings and Markers

Item No. 678 Pavement Surface Preparation For Markings

### **Texas Department of Transportation:**

Manual of Testing Procedures

Designation Description

Tex-829-B Method for Measuring Pavement Temperatures Thickness

Current Version: September 26, 2012

Item No. 863S Reflectorized Pavement Markers

#### 863S.1 Description

This item governs reflectorized pavement markers to be used to delineate traffic lanes or fire hydrants.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 863S.2 Submittals

The submittal requirements of this specification item include:

- A. List of specific application(s) [i.e. type: (reflectorized Type I-A, I-C or II-A-A, II-B-B or II-C-R)] and applicable epoxy system and adhesive types [867S.5].
- B. Specific manufacturer with test results and technical specifications for proposed pavement markers.
- C. Manufacturer's recommendations for surface preparation, cleaning, placement temperatures and installation instructions.
- D. Adhesive components and mixing recommendations.

#### 863S.3 Materials

All materials shall meet the requirements as specified below and indicated on City of Austin Standard Detail 863S-1, "Pavement Markers (Reflectorized - Type I & II)". The pavement markers shall comply with TxDoT Departmental Materials Specifications DMS-4210.

#### A. Design and Shape

The outer surface of the marker shall be smooth and all corners and edges exposed to traffic must be rounded. The base of the marker shall have a width of 4.0 inches + 1/2 inch (100 mm + 13 mm) and shall have a minimum area exposed to traffic of 12.5 square inches (8000 square mm). The maximum height shall be 3/4 inch (19 mm). The maximum slope of the reflector face or faces shall be not more than 30 degrees from the horizontal.

The bottom surface of the markers shall be of a design for adhesion with epoxy adhesives to comply with TxDoT Test Method Tex-611-J.

The marker shall be designed to show no change in shape or color when subjected to the requirements of TxDoT Test Method Tex-846-B, at a temperature of 140°F (60°C) with the marker in a vertical position.

#### B. Optical

#### 1. Definitions

(a) Horizontal entrance angle is defined as being in a plane parallel to the base of the road marker, between a line in the direction of the incident light and a line that is perpendicular to the leading edge of the reflective surface.

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- (b) Divergence angle shall mean the angle at the reflector between observer's line of sight and the direction of the light incident on the marker.
- (c) Specific intensity shall mean candle power of the returned light at the chosen divergence and entrance angles for each footcandle of incident light per reflective face. TxDoT Test Method Tex-842-B will be used to determine specific intensity.

#### 2. Performance

For the pavement markers the specific intensity of the reflecting surface at a 15degree divergence angle shall be not less than the following when the incident light is parallel to the base of the marker.

Specific Intensity

Horizontal Entrance Angle, Degrees	Cry stal	A mb er
0	3.0	2.0
20	1.5	1.0

The specific intensity of the marker shall not be less than 80 percent of the above minimum values after being subjected to heat test of TxDoT Test Method Tex-846-B.

### C. Pavement Marker Types

Pavement markers shall be of the following types:

- 1. Type I-A shall contain an approach face that reflects amber light. The body, other than the reflective face, shall be yellow.
- 2. Type I-C shall contain an approach face that reflects white light. The body, other than the reflective face, shall be white, silver white or light gray.
- 3. Type II-A-A, shall contain two reflective faces (approach and trailing), each of which shall reflect amber light. The body, other than the reflective faces, shall be yellow.
- 4. Type II-B-B shall contain two reflective faces (approach and trailing) with glass covered pneumatic reflective faces, each of which shall reflect blue light. The body, other than the reflective faces, shall be blue.
- 5. Type II-C-R shall contain two reflective faces (approach and trailing), one of which reflects white light and one of which reflects red light. The body, other than the reflective faces, shall be either white, silver white or light gray or one-half white, silver white or light gray on the side that reflects white light and one-half red on the side that reflects red light.

The reflective faces of the Type II markers shall be located so that the direction from one face shall be directly opposite the direction of reflections of the other face.

#### 863S.4 Sampling

Sampling will be conducted in accordance with TxDoT Test Method Tex-729-I.

#### 863S.5 Testing

The Contractor shall certify that the markers meet the requirements defined in the specification and meet or exceed the applicable tests required. All testing will be in accordance with the TxDoT manual of Testing Procedures. Applicable tests shall include the following:

Tex-611-J: Adhesion Requirements
Tex-842-B: Light Retroreflectivity
Tex-846-B: Heat Resistance

Blue markers' color will conform to Fire Department requirements.

#### 863S.6 Construction Methods

The Contractor shall use a crew experienced in the work of installing reflectorized pavement markers and in the necessary traffic control for such operations on the roadway surface and shall supply all the equipment, personnel, traffic control and materials necessary for the placement of the pavement markings as indicated on the Drawings or as directed by the Engineer or designated representative. All work shall conform to the current edition of the Texas Manual of Uniform Traffic Control Devices (TMUTCD), The City of Austin Transportation Criteria Manual and Standard Detail 863S-1.

All reflectorized pavement markers shall be from the same manufacturer. Surfaces to which markers are to be attached by an adhesive shall be prepared by any method approved by the Engineer or designated representative to ensure that the surface is free of dirt, curing compound, grease, oil, moisture, loose or unsound pavement markings and any other material which would adversely affect the adhesive bond. Unless indicated otherwise on the Drawings, surface preparation for installation of raised reflectorized pavement markers will not be paid for directly, but shall be included in the unit price bid for this specification item.

Guides to mark the lateral location of pavement markings shall be established as indicated on the Drawings or as directed by the Engineer or designated representative. The Contractor will establish the pavement marking guides and the Engineer or designated representative will verify the location of the guides prior to final installation.

The pavement markers shall be placed in proper alignment with the Guides. The deviation rate in alignment shall not exceed 1 inch per 200 feet (25 millimeters per 60 meters) of roadway. The maximum deviation shall not exceed 2 inches (50 millimeters) nor shall any deviation be abrupt.

Markers placed which are not in alignment indicated on the Drawings shall be removed by the Contractor at the Contractor's expense. Removal shall be in accordance with Specification Item 874S except for measurement and payment. Guides placed on the roadway for alignment purposes shall not establish a permanent marking on the roadway.

The Reflectorized Pavement Markers shall be applied using an approved epoxy adhesive (City of Austin Standard Specification Item 867S) to the lines and spacings as indicated on the Drawings or as directed by the Engineer or designated representative. The adhesive shall be applied in sufficient quantity to ensure that 100 percent of the bonding area of the pavement markers shall be in contact with the adhesive. The adhesive shall be applied in accordance with the manufacturer's recommendations.

Pavement markers shall be placed immediately after the adhesive is applied and shall be firmly bonded to the pavement. Adhesive or any other material that impairs functional reflectivity will not be acceptable.

When deemed necessary by the Engineer or designated representative, the Contractor, at the Contractor's expense, shall place any additional pilot markings required to facilitate the placement of the permanent markings in the alignment specified. Any and all additional markings placed on the roadway for alignment purposes shall be temporary in nature and shall not establish a permanent marking on the roadway. Materials used for pilot markings and equipment used to place such markings shall be approved by the Engineer or designated representative.

#### 863S.7 Measurement

Reflectorized Pavement Marker will be measured as per each, complete in place.

#### 863S.8 Payment

Payment will be made at the unit bid price per each. The price shall include full compensation for all work performed and all materials furnished in constructing, transporting and placing the markers.

Payment will be made under:

Pay Item No. 863S -1:	Reflectorized Pavement Markers (Type I-A) -	Per Each.
Pay Item No. 863S -2:	Reflectorized Pavement Markers (Type I-C) -	Per Each.
Pay Item No. 863S -3:	Reflectorized Pavement Markers (Type II-A-A) -	Per Each.
Pay Item No. 863S -4:	Reflectorized Pavement Markers (Type II-B-B) -	Per Each.
Pay Item No. 863S -5:	Reflectorized Pavement Markers (Type II-C-R) -	Per Each.

#### **End**

#### **SPECIFIC CROSS REFERENCE MATERIALS**

Specification Item 863S "Reflectorized Pavement Markers"

Texas Department of Transportation: Manual of Testing Procedures

Designation Description

Tex 611-J Adhesion Test For Traffic Buttons, Markers, and Jiggle Bars

Tex-729-I Sampling of Traffic Markers

Method for Measuring Retroreflectivity Tex-842-B

Method of Testing The Heat Resistance of Reflector Units Tex-846-B

Texas Department of Transportation: Departmental Materials Specifications

Description **Designation** 

DMS-4210 Pavement Markers (All Weather Reflectorized

City of Austin Standard Details Designation Description

863S-1 Pavement Buttons (Reflectorized-Type I & Type II)

City of Austin Standard Specifications Designation Description

Item No. 867S **Epoxy Adhesive** 

Eliminating Existing Pavement Markings and Markers Item No. 874S

Item No. 875S Pavement Surface Preparation For Markings

City of Austin Transportation Criteria Manual

Designation Description Section 8 Traffic Control

State of Texas Manual on Uniform Traffic Control Devices for Streets and Highways

Designation **Description** Part III Markings

Part VI Traffic Controls for Street and Highway Construction, Maintenance,

**Utility and Incident Management Operations** 

Markings Part VI, Article D

Part VI, Article F Control of Traffic Through Work Areas

### **RELATED** CROSS REFERENCE **MATERIALS**

City of Austin Standard Specifications **Designation Description** 

Item No. 865S Non-Reflectorized Traffic Buttons Item No. 870S Work Zone Pavement Markings Item No. 871S Reflectorized Pavement Markings

Raised Pavement Markers Item No. 873S

Texas Department of Transportation: Standard Specifications for Construction

and Maintenance of Highways, Streets, and Bridges

Designation Description

Item No. 666 Reflectorized Pavement Markings

Raised Pavement Markers Item No. 672

Item No. 677 Eliminating Existing Pavement Markings and Markers

Pavement Surface Preparation For Markings Item No. 678

Current Version: June 21, 2007

Item No. 871S Reflectorized Pavement Markings

### 871S.1 Description

This item shall govern furnishing and placement of reflectorized pavement markings of the colors, types, shapes, sizes, widths and thickness indicated on the Drawings.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

#### 871S.2 Materials

A. Type I Marking Material.

Type I markings are thermoplastic type materials that require heating to elevated temperatures for application. Type I marking materials shall conform to TxDOT Departmental Materials Specification Item DMS-8220, "Thermoplastic Pavement Markings". Each container of Type I Marking Material shall be clearly marked to indicate the color, weight (mass), type of material, manufacturer's name and lot/batch number.

B. Type II Marking Material.

Type II markings are paint- type materials that are applied at ambient temperature or slightly elevated temperatures. Type II marking materials shall conform to Specification Item No. 860S, "Pavement Marking Paint".

C. Source of Supply.

All Type I marking materials shall be purchased on the open market. All glass traffic beads shall be purchased on the open market.

#### 871S.3 Equipment Requirements

The equipment used to place pavement markings shall:

- (1) be maintained in satisfactory operating condition;
- (2) be considered in satisfactory operating condition if it has an average placement rate of 5,000 lineal feet (1 525 lineal meters) per hour of acceptable four (4) inch {100 millimeters} solid or broken lines over any five (5) consecutive working days;
- (3) meet or exceed the material handling at elevated temperature requirements of the National Fire Underwriters and the Texas Railroad Commission;
- (4) be capable of placing a minimum of 40,000 lineal feet (12 190 lineal meters) of 4 inch {100 millimeters} solid or broken markings per day;
- (5) have production capabilities similar to four-inch (100 mm) marking equipment and shall be capable of placing linear markings up to 8 inches {200 millimeters} in width in a single pass when used for placing markings in widths other than 4 inches {100 millimeters}:
- (6) have production capabilities considered satisfactory by the Engineer or designated representative, when used to place markings other than solid or broken lines;

- (7) be capable of placing a centerline and no-passing barrier-line configuration consisting of one broken line with two solid lines at the same time to the alignment and spacing shown on the Drawings;
- (8) be capable of placing broken and/or continuous white line from both sides;
- (9) be capable of placing lines with clean edges and of uniform cross-section. All lines shall have a tolerance of plus or minus 1/8 inch per 4-inch width {3 mm per 100-mm width}:
- (10) have an automatic cut-off device with manual operating capabilities to provide clean, reasonably square marking ends to the satisfaction of the Engineer, and to provide a method of applying broken line in an approximate stripe-to-gap ratio of 10 to 30. The length of the stripe shall not be less than 10 feet (3.05 meters) or more than 10.5 feet (3.2 meters). The total length of any stripe-gap cycle shall not be less than 39.5 feet (12 meters) or more than 40.5 feet (12.3 meters);
- (11) provide continuous mixing and agitation of the pavement marking material. The use of pans, aprons or similar appliances, which the die overruns, will not be permitted for longitudinal striping applications;
- (12) apply beads by an automatic bead dispenser attached to the pavement marking equipment in such a manner that the beads re-dispensed uniformly and almost instantly upon the marking as the marking is being applied to the road surface. The bead dispenser shall have an automatic cut-off control, synchronized with the cut-off of the pavement marking equipment.

#### 871S.4 Construction Methods

### A. General.

When required by the Engineer, the Contractor and the Engineer shall review the sequence of Work to be followed and the estimated progress schedule.

Markings may be placed on streets either free of traffic or open to traffic. On streets already open to traffic, the markings shall be placed under traffic conditions that exist with a minimum of interference to the operation of the facility. Traffic control shall be as shown on the Drawings or as approved in writing by the Engineer or designated representative. All markings placed under open-traffic conditions shall be protected from traffic damage and disfigurement. On streets open to traffic with 3 lanes of travel in one direction, all markings shall be placed from the outside lanes only, unless otherwise approved in writing by the Engineer or designated representative.

Guides to mark the lateral location of pavement markings shall be established as shown on the Drawings or as directed by the Engineer or designated representative. The Contractor shall establish the pavement marking guide and the Engineer or designated representative will verify the location of the guides.

Markings shall be placed in proper alignment with the guides. The deviation rate in alignment shall not exceed 1 inch per 200 feet {25 mm per 60 meters} of street. The maximum deviation shall not exceed 2 inches {50 millimeters} nor shall any deviation be abrupt.

Markings shall essentially have a uniform cross-section. The density and quality of markings shall be uniform throughout their thickness. The applied markings shall have no more than five (5) percent, by area, of holes or voids and shall be free of blisters.

Markings, in place on the street, shall be reflectorized both internally and externally. Glass beads shall be applied to the materials at a uniform rate sufficient to achieve uniform and distinctive retroflective characteristics when observed in accordance with TxDOT Test Method Tex-828-B.

Contractor personnel shall be sufficiently skilled in the Work of installing pavement markings.

Markings placed that are not in alignment or sequence, as shown on the drawings or as stated in the Standard Specification Item, shall be removed by the Contractor at its own expense. Removal shall be in accordance with Specification Item 874S, "Eliminating Existing Pavement Markings and Markers", except for measurement and payment. Guides placed on the street for alignment purposes shall not establish a permanent marking on the street.

Unless indicated otherwise on the Drawings, pavement markings shall not be placed sooner than 3 calendar days after the placement of a new hot mix asphaltic concrete surface course or surface treatment.

Unless otherwise shown on the Drawings, pavement markings may be applied by any method that will yield markings meeting the requirements of the Specification Item.

### B. Surface Preparation

New Portland cement concrete surfaces shall be cleaned in accordance with Specification Item 875S, "Pavement Surface Preparation for Markings" to remove curing membrane, dirt, grease, loose and/or flaking existing construction markings and other forms of contamination.

Older Portland cement concrete surfaces and asphaltic surfaces that exhibit loose and/or flaking existing markings shall be cleaned in accordance with Specification Item 875S, "Pavement Surface Preparation for Markings" to remove all loose and flaking markings.

Pavement to which material is to be applied shall be completely dry. Pavements shall be considered dry if, on a sunny day after observation for 15 minutes, no condensation occurs in the underside of a 1 foot {300 mm} square piece of clear plastic that has been placed on the pavement and weighted on the edges.

### C. Application of Type I Markings.

New Portland cement concrete surfaces shall be further prepared for Type I markings, after cleaning, by placing a Type II marking as a sealer in accordance with the Specification Item. When placing Type I markings in new locations on asphaltic surfaces 3 years old or older or any Portland cement concrete surfaces, a Type II marking shall be used as a sealer. Unless otherwise shown on the Drawings, existing Portland cement concrete and asphaltic surfaces to be restriped will not require Type II markings as a sealer; existing markings may be used as a sealer in lieu of Type II markings. Type II markings shall be placed a minimum of 2 and a maximum of 30 calendar days in advance of placing Type I markings. Type II markings which become dirty due to inclement weather or street conditions shall be cleaned by washing, brushing, compressed air or other means approved by the Engineer, prior to application of Type I markings. If washing is used, the surface of Type II markings shall become thoroughly dry before placing Type I

markings. Color, location and configuration of Type II markings shall be the same as that of Type I markings.

Type I pavement marking material shall be applied within temperature limits recommended by the material manufacturer. Application of Type I pavement markings shall be done only on clean, dry pavement having a surface temperature above 50°F (10°C). Pavement temperature shall be measured in accordance with TxDOT Test Method Tex-829-B.

When Type I pavement marking application is by spray, and operations cease for 5 minutes or more, the spray head shall be flushed by spraying pavement marking material into a pan or similar container until the pavement marking material being sprayed is at the proper temperature for application.

Unless otherwise directed by the Engineer in writing, Type I pavement-marking materials shall not be placed on streets between September 30 and March 1, subject to temperature and moisture limitations specified herein.

Unless otherwise shown on the Drawings, the minimum thickness of Type I marking shall be 0.060 inches (60 mil) {1.5 millimeters} for edgeline markings and 0.090 inches (90 mil) {2.3 millimeters} for stop-bars, legends, symbols, gore and center-line/no-passing barrierline markings, when measured in accordance with TxDOT Test Method Tex-854-B. The maximum thickness of all Type I markings shall be 0.180 inches (180 mil) {4.6 millimeters \}.

The thickness of Type I markings at the time of placement will be measured above the plane formed by the payement surface. The Contractor will supply an approved device to measure the thickness of the applied markings. The markings shall be of uniform thickness throughout their lengths and widths.

### D. Application of Type II Markings

The application of Type II marking materials shall be done only on surfaces with a minimum surface temperature of 50°F (10°C).

The application rate for Type II marking material shall be between 15 and 20 gallons per mile (35 to 47 liters per kilometer) of solid 4 inch {100 millimeter} line and between 30 and 40 gallons per mile (70 to 95 liters per kilometer) of solid 8 inch {200 millimeter} line. For new surface treatment projects the application rate shall be between 25 and 30 gallons per mile (60 to 70 liters per kilometer) of solid four (4) inch line {one hundred (100) millimeters} and between 40 and 50 gallons per mile (95 to 120 liters per kilometer) of solid 8 inch {200 millimeters} line.

Pavement markings for new surface treatment projects shall be applied in two applications, each approximately one-half the application rate. The first application shall not contain glass beads. The interval between the first and second application shall be a minimum of 1 hour.

When there is impending inclement weather and the Contractor chooses to apply waterbased traffic paint and the markings, that are subsequently damaged by rain, sleet, hail, etc., the Contractor is responsible for all costs associated with the replacement markings. The Contractor will be paid, when the work is acceptable.

#### 871S.5 Performance Period for Type I Markings.

Type I pavement markings shall meet all the requirements of this technical specification for a minimum of 15 calendar days after installation. Pavement markings that fail to meet all requirements of this specification shall be removed and replaced by the Contractor at its own expense. The Contractor shall replace all pavement markings failing the requirements of this technical specification within 30 calendar days following notification by the Engineer or designated representative of such failing. All replacement markings shall also meet all requirements of this technical specification for a minimum of 15 calendar days after installation.

#### 871S.6 Measurement

This Specification Item will be measured by the lineal foot (lineal meter), by each of the various words, shapes or symbols, or by any other unit as shown on the Drawings.

Where double stripes are placed, each stripe will be measured separately.

Type II pavement markings requiring 2 applications on new surface treatments (Specification Item No. 320S) will be measured as 1 marking.

Type II pavement marking materials, when used as a sealer for Type I markings will be measured as Type II markings.

Final work zone pavement markings (paint and beads), which will be used as a sealer for Type I pavement markings, will not be measured for payment.

#### 871S.7 Payment

The work performed and materials furnished in accordance with this Standard Specification Item and measured as provided under "Measurement" will be paid for at the Unit bid price for "Reflectorized Pavement Markings" of the various types, colors, shapes, sizes, widths and thickness (Type I markings only) specified. This price shall include full compensation for furnishing all materials; for application of pavement markings; and for all other labor, tools, equipment and incidentals necessary to complete the Work, except as described below.

Surface Preparation, when indicated on the Drawings, will be paid for under Specification Item 875S, "Pavement Surface Preparation for Markings."

Final work zone pavement markings (paint and beads), which will be used as a sealer for Type I pavement markings, shall be included in the unit price bid for the item of construction for which final work zone pavement markings are used.

When replacement Type II markings are required due to damage to the original markings from rain, sleet, hail, etc., and the original markings were placed at the Direction of the Engineer, the Contractor will be paid for the actual quantity of original and replacement markings at the unit bid price for the bid item.

Payment will be made under one or more of the following:

### Original placement of Reflectorized Pavement Markings:

Pay Item 871S-A:	Reflectorized Type I Thermoplastic Pavement Markings	
	inches in width,mils in thickness in color	per lineal foot.
Pay Item 871S-B:	Reflectorized Type I Thermoplastic Pavement Markings	Words
	inches in width, mils in thickness in color	per each

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Pay Item 871S-C: Reflectorized Type I Thermoplastic Pavement Markingsinches in width, mils in thickness in colo	Shapes or per each.
Pay Item 871S-D: Reflectorized Type I Thermoplastic Pavement Markingsinches in width, mils in thickness in colo	Symbols per each.
Pay Item 871S-E: Reflectorized Type II Paint Pavement Markingsinches in width, in color	per lineal foot.
Pay Item 871S-F: Reflectorized Type II Paint Pavement Markingsinches in width, in color	<u>Words</u> per each.
Pay Item 871S-G: Reflectorized Type II Paint Pavement Markingsinches in width, in color	<u>Shapes</u> per each.
Pay Item 871S-H: Reflectorized II Paint Pavement Markingsinches in width, in color	<u>Symbols</u> per each.
Replacement of Reflectorized Pavement Markings:	
Pay Item 871S-AR: Replace Reflectorized Type I Thermoplastic Pavementinches in width,mils in thickness in color	
Pay Item 871S-BR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in c	
	color per each. Markings <u>Shapes</u>
inches in width, mils in thickness in c Pay Item 871S-CR: Replace Reflectorized Type I Thermoplastic Pavement	color per each.  Markings <u>Shapes</u> r per each.  Markings <u>Symbols</u>
inches in width, mils in thickness in color pay Item 871S-CR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in color pay Item 871S-DR: Replace Reflectorized Type I Thermoplastic Pavement	color per each.  Markings Shapes r per each.  Markings Symbols r per each.
inches in width, mils in thickness in color leads to the state of the s	Markings Shapes r per each.  Markings Symbols r per each. s per lineal foot.
inches in width, mils in thickness in color  Pay Item 871S-CR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in color  Pay Item 871S-DR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in color  Pay Item 871S-ER: Replace Reflectorized Type II Paint Pavement Markinginches in width, in color  Pay Item 871S-FR: Replace Reflectorized Type II Paint Pavement Markings	Markings Shapes r per each.  Markings Symbols r per each.  s per lineal foot. s Words per each.
inches in width, mils in thickness in color  Pay Item 871S-CR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in color  Pay Item 871S-DR: Replace Reflectorized Type I Thermoplastic Pavementinches in width, mils in thickness in color  Pay Item 871S-ER: Replace Reflectorized Type II Paint Pavement Markinginches in width, in color  Pay Item 871S-FR: Replace Reflectorized Type II Paint Pavement Markinginches in width, in color  Pay Item 871S-GR: Replace Reflectorized Type II Paint Pavement Marking	Markings Shapes r per each.  Markings Symbols r per each.  S per lineal foot. S Words per each. S Shapes per each.

#### **SPECIFIC CROSS REFERENCE MATERIALS**

Specification Item No. 871S, "Reflectorized Pavement Markings"

<u>City of Austin Contract Documents</u> <u>Designation</u> <u>Description</u>

Section 00300U Bid Form (Unit Price)

City of Austin Standard Specifications

Description Description

Item No. 320S Two Course Surface Treatment

Item No. 860S Pavement Marking Paint (Reflectorized)

Item No. 874S Eliminating Existing Pavement Markings and Markers

Item No. 875S Pavement Surface Preparation For Markings

Texas Department of Transportation: Manual of Testing Procedures

<u>Designation</u> <u>Description</u>

Tex-828-B Determining Functional Characteristics of Pavement Markings

871S 06/21/07 Page 6 Reflectorized Pavement Markings

Tex-829-B Method For Measuring Pavement Temperature

Tex-854-B Evaluation Of Thermoplastic Striping For Uniformity And Thickness

#### **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 871S, "Reflectorized Pavement Markings"

#### City of Austin Standard Specifications

<u>Designation</u>	D <u>escription</u>
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments
Item No. 310S	Emulsified Asphalt Treatment
Item No. 311S	Emulsified Asphalt Repaving
Item No. 312S	Seal Coat
Item No. 313S	Rubber Asphalt Joint and Crack Sealant
Item No. 315S	Milling Asphaltic Concrete Paving
Item No. 340S	Hot Mix Asphaltic Concrete Pavement
Item No. 341S	Paving Fabric
Item No. 350S	Heating, Scarifying and Repaving
Item No. 360	Concrete Pavement
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Nonreflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 872S	Prefabricated Pavement Markings
Item No. 873S	Raised Pavement Markers
Item No. 863S-1 Item No. 865S-1	Pavement Buttons (Reflectorized-Type I & Type II) Traffic Buttons (Non-Reflectorized)

### Texas Department of Transportation: <u>Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges</u>

Designation
Item No. 302
Item No. 314

Item No. 315 Emulsified Asphalt Seal Item No. 316 Surface Treatments

Item No. 334 Hot Mix-Cold Laid Asphaltic Concrete Pavement

#### **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 871S, "Reflectorized Pavement Markings"

### Texas Department of Transportation: <u>Standard Specifications for Construction and Maintenance of Highways</u>. Streets, and Bridges

	a. / c.   c.   c.   a.   a.   a.   a.   a.
Designation	Description
Item No. 340	Hot Mix Asphaltic Concrete Pavement
Item No. 342	Plant Mix Seal
Item No. 351	Repairing Existing Flexible Pavement Structure
Item No. 354	Planing and/or Texturing Pavement
Item No. 358	Asphaltic Concrete Surface Rehabilitation
Item No. 360	Concrete Pavement
Item No. 421	Hydraulic Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 428	Concrete Surface Treatment

Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers
Item No. 677	Eliminating Existing Pavement Markings and Markers
Item No. 678	Pavement Surface Preparation For Markings

Texas Department of Transportation: Manual of Testing Procedures

Description

Designation Tex 729-I Sampling of Traffic Markers

Texas Department of Transportation: <u>Departmental Materials Specifications</u>

<u>Designation</u>	Description
DM S-4100	Jiggle Bar Tile
DMS-4200	Pavement Markers (Reflectorized)
DMS-4300	Traffic Buttons
DMS-4210	Pavement Markers
DMS-6130	Bituminous Adhesive
DMS-8200	Pavement Paint
DMS-8220	Thermoplastic marking material
DMS-8240	Prefabricated Marking Materials
DMS-8241	Removable Tape
DMS-8290	Pavement Paint
VDT 40 1/	

WPT-10 **Pavement Paint** 

Previous Versions: .6/21/07, 11/21/05, 11/17/03, 05/21/01, 05/23/00 and 04/05/99

Item No. 874S
Eliminating Existing Pavement
Markings and Markers

#### 874S.1 Description

This item shall govern the elimination of existing pavement markings of various types and sizes, and pavement markers as shown on the Drawings or as directed, in writing, by the Engineer or designated representative.

#### 874S.2 Materials

All surface treatment material application rates shall be as directed by the Engineer or designated representative. Unless otherwise shown on the Drawings, surface treatment materials shall conform to the requirements of Specification Item 301S, "Asphalts, Oils and Emulsions", and Specification Item 302S, "Aggregates for Surface Treatment". Testing of surface treatment materials may be waived by the Engineer or designated representative. Asphalt and aggregate types and grades shall be as shown on the Drawings or as approved by the Engineer or designated representative.

#### 874S.3 Construction Methods

Elimination of existing pavement markings and markers shall be accomplished by one or more of the following methods as approved by the Engineer or designated representative.

- A. Markings on Asphaltic Surfaces.
  - 1. Placement of a surface treatment a minimum of two (2) feet {600 mm} wide to cover the existing marking.
  - Placement of a surface treatment, thin overlay or microsurfacing a minimum of one (1) lane in width in areas where directional changes of traffic are involved or other areas as directed by the Engineer or designated representative. Construction methods for surface treatments shall conform to Specification Item 320S, "Two Course Surface Treatment".
- B. Markings on Concrete Surfaces.
  - Removal by an approved burning method.
- C. Markings on Asphaltic or Concrete Surfaces.
  - Removal by water, water-sand blasting techniques or any other method(s) proven satisfactory to the Engineer.
- D. Markers on Asphaltic or Concrete Surfaces.
  - Removal by any mechanical method to remove marker and adhesive.

Current Version: April 3, 2009

Existing pavement markings and markers on both concrete and asphaltic surfaces shall be removed in such a manner that color and/or texture contrast of the pavement surface will be held to a minimum.

Removal of pavement markings on concrete surfaces by blast cleaning shall be accomplished in accordance with Specification Item 875S, "Pavement Surface Preparation for Markings", except for measurement and payment. Blast cleaning shall be performed in such a manner that damage to the Portland cement concrete surface is held to a minimum.

When thermoplastic pavement markings or prefabricated pavement markings are encountered, the application of heat may be used to remove the bulk of the marking material prior to blast cleaning. When heat is used, care shall be taken to prevent spalling of Portland cement concrete surfaces.

A burner may be used for complete removal of pavement markings. Broom removal or light blast cleaning may be used for removal of minor residue.

Damage to asphaltic surfaces, such as spalling, shelling, etc., that is greater than ¼ inch (6 mm) in depth and is caused by the removal of pavement markers shall be repaired by the application of a two (2) foot (600 mm) wide surface treatment for longitudinal markers with no directional change or a minimum of one (1) lane width surface treatment in areas where directional changes of traffic are involved.

Grinding is not an acceptable method of marker or marking removal. However, equipment utilizing special milling flails is considered acceptable in the removal of markings and markers on asphalt and Portland cement concrete surfaces.

#### 874S.4 Measurement

This Specification Item will be measured by the square yard (square meter: 1 square meter is equal to 1.196 square yards) of surface treatment, thin overlay or microsurfacing (full lane width) placed; by each word, symbol or shape eliminated; by the lineal foot (lineal meter: 1 lineal meter is equal to 3.281 lineal feet) of markings eliminated; or by any other unit as shown on the Drawings.

Payment for revised quantities will be paid for at the unit price bid for that bid item.

The elimination of pavement markers required in conjunction with the elimination of longitudinal markings will not be measured for payment.

#### 874S.5 Payment

The work performed and materials furnished in accordance with this Specification Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Eliminating Existing Pavement Markings and Markers" of the various types specified. This price shall include full compensation for blast cleaning, mechanical cleaning and/or other cleaning methods; for all materials, tools, equipment and incidentals necessary to complete the Work, except as specified below.

Current Version: April 3, 2009

Elimination of pavement markers when pavement markers are to be removed in conjunction with the elimination of longitudinal markings shall be included in the unit price bid for the item of construction indicated on the drawings.

Payment will be made under one or more of the following:

Pay Item 874S-A: Eliminating Existing Pavement Markings: inches in width, per lineal foot Pay Item 874S-B: Eliminating Existing Work Zone Pavement Markings: inches in width, per lineal foot Pay Item 874S- C: Eliminating Existing Reflectorized Thermoplastic Pavement Words inches in width per each Markings: Pay Item 874S- D: Eliminating Existing Reflectorized Thermoplastic Pavement **Shapes** \_\_\_inches in width per each Markings: Pay Item 874S- E: Eliminating Existing Reflectorized Thermoplastic Pavement Markings: **Symbols** \_\_\_inches in width per each Pay Item 874S- F: Eliminating Existing Raised Pavement Markings, per each

Type'.

#### **END**

#### **SPECIFIC** CROSS REFERENCE MATERIALS

Specification Item No. 874S, "Eliminating Existing Pavement Markings And Markers"

#### City of Austin Contract Documents Designation Description

Section 00300U Bid Form (Unit Prices)

#### City of Austin Standard Specifications

<u>Designation</u>	D <u>escription</u>
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments
Item No. 320S	Two Course Surface Treatment
Item No. 875S	Pavement Surface Preparation For Markings

#### **RELATED** CROSS REFERENCE MATERIALS

Specification Item No. 874S, "Eliminating Existing Pavement Markings And Markers"

#### City of Austin Standard Specifications

Designation	<u>n</u> <u>լ</u>	<u>Description</u>
Item No. 3	10S	Emulsified Asphalt Treatment
Item No. 3	11S	Emulsified Asphalt Repaving
Item No. 3	12S	Seal Coat
Item No. 3	13S (	Cleaning and/or Sealing Joints and Cracks (Asphaltic Concrete)
Item No. 3	15S	Milling Asphaltic Concrete Paving
Item No. 3	40S	Hot Mix Asphaltic Concrete Pavement
Item No. 3	41S	Paving Fabric
Item No. 3	50S	Heating, Scarifying and Repaving
Item No. 3	60	Concrete Pavement

Previous Versions: .6/21/07, 11/21/05, 11/17/03, 05/21/01, 05/23/00 and 04/05/99

Item No. 413S	Cleaning and/or Sealing Joints and Cracks (Portland Cement Concrete)
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 860S	Pavement Marking Paint (Reflectorized)
Item No. 863S	Reflectorized Pavement Markers
Item No. 864S	Abbreviated Pavement Markings
Item No. 865S	Non-Reflectorized Traffic Buttons
Item No. 866S	Jiggle Bar Tile
Item No. 867S	Epoxy Adhesive
Item No. 870S	Work Zone Pavement Markings
Item No. 871S	Reflectorized Pavement Markers
Item No. 872S	Prefabricated Pavement Markings
Item No. 873S	Raised Pavement Markings
City of Austin Stand	dard Details
Designation	Description

Pavement Buttons (Reflectorized-Type I & Type II) 863S-1

865S-1 Traffic Buttons (Non-Reflectorized)

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

<u>Designation</u>	Description
Item No. 302	Aggregates for Surface Treatments
Item No. 314	Emulsified Asphalt Treatment
Item No. 315	Emulsified Asphalt Seal
Item No. 316	Surface Treatments
Item No. 334	Hot Mix-Cold Laid Asphaltic Concrete Pavement
Item No. 340	Hot Mix Asphaltic Concrete Pavement
Item No. 342	Plant Mix Seal
Item No. 351	Repairing Existing Flexible Pavement Structure
Item No. 354	Planing and/or Texturing Pavement
Item No. 358	Asphaltic Concrete Surface Rehabilitation
Item No. 360	Concrete Pavement
Item No. 421	Hydraulic Cement Concrete
Item No. 427	Surface Finishes for Concrete
Item No. 428	Concrete Surface Treatment
Item No. 662	Work Zone Pavement Markings
Item No. 666	Reflectorized Pavement Markings
Item No. 667	Prefabricated Pavement Markings
Item No. 672	Raised Pavement Markers
Item No. 677	Eliminating Existing Pavement Markings and Markers
Item No. 678	Pavement Surface Preparation For Markings

#### **RELATED CROSS REFERENCE MATERIALS - Continued** Specification Item No. 874S, "Eliminating Existing Pavement Markings And Markers"

Texas Department of Transportation: Manual of Testing Procedures

Designation Description

Tex 729-I Sampling of Traffic Markers

Tex-828-B **Determining Functional Characteristics of Pavement Markings** 

Tex-829-B Method For Measuring Pavement Temperature

Evaluation Of Thermoplastic Striping For Uniformity And Thickness Tex-854-B

Texas Department of Transportation: <u>Departmental Materials Specification</u>

Previous Versions: .6/21/07, 11/21/05, 11/17/03, 05/21/01, 05/23/00 and 04/05/99

<u>Designation</u>	<u>Description</u>
DMS-4100	Jiggle Bar Tile
DMS-4200	Pavement Markers (Reflectorized)
DMS-4300	Traffic Buttons
DMS-4210	Pavement Markers
DMS-6130	Bituminous Adhesive
DMS-8200	Pavement Paint
DMS-8220	Thermoplastic marking material
DMS-8240	Prefabricated Marking Materials
DMS-8241	Removable Tape
DMS-8290	Pavement Paint
YPT-10 and/or	
WPT-10	Pavement Paint



SP510 PIPE

### SPECIAL PROVISION To Standard Specification Item No. 510 (Version 12/08/2018) Pipe

For this project, Item No. 510, Pipe, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this section of the City of Austin Standard Technical Specification are waived or changed.

#### 1. 510.3 Construction Methods

Add the following section at the end of Section 510.3.(25) – Backfilling

(j) Backfill Materials for Pipe in paved areas

All Pipes in paved areas shall be backfilled with Controlled Low Strength Material (CLSM) and per Special Detail SD-3 "Special Detail – Typical Trench with Paved Surface Using CLSM (Flowable Fill)." CLSM shall conform to Item 402S, "Controlled Low Strength Material."

Add the following sections at the end of Section 510.3 - Construction Methods

(31) Mid Span Restraint with Concrete Thrust Collar

Mid Span Restraint with Concrete Thrust Collar shall be constructed per "Special Detail – Concrete Thrust Collar" for existing and proposed water line. Type V cement for concrete is required.

(32) Service Saddle Installation

Service Saddle Installation shall be installed as recommended by the manufacturer and as approved by the E/A. Direct tapping will not be permitted.

#### 2. 510.4 Measurement

**Add** the following paragraphs at the end of Section 510.4 – Measurement

Pipe will be measured by the linear foot for the various types, sizes and classes, including excavation and backfill for Pipe in unpaved areas, and excavation and CLSM backfill for Pipe in paved areas.

Cut/Plug Existing Water Line will be measured per each, for all depths and sizes, including excavation and backfill, complete in place.

SP510 PIPE

Connecting to Existing Service Saddle will be measured per each connection, including core bit drilled existing concrete vault, seal void with Link-Seal Modular Seals series LS-275- (or approved equal), excavation and backfill, complete in place.

Service Saddle Installation will be measured per each, for the indicated size regardless of depth, including excavation and backfill, complete in place.

Mid Span Restraint with Concrete Thrust Collar per "Special Detail – Concrete Thrust Collar" for existing water line will be measured per each, for the indicated size regardless of depth, including excavation and backfill, complete in place. Mid Span Restraint with Concrete Thrust Collar per "Special Detail – Concrete Thrust Collar" for proposed water line will not be measured separately for payment and is included in the unit price for the respective pipe bid items.

Hand Excavation in Tree Root Protection Zone will not be measured separately for payment and is included in the unit price for the respective pipe bid items.

#### 3. 510.5 Payment

**Add** the following sections at the end of Section 510.5 – Payment

#### (15) Pipe

Pipe, measured as prescribed above, will be paid for at the unit bid price per linear foot for the various sizes of pipe, of the materials and type indicated, complete in place. The unit bid price shall include all labor, equipment, materials, time and incidentals necessary to complete the work.

#### (16) Cut/Plug Existing Water Line

Cut/Plug Existing Water Line, measured as prescribed above, will be paid for at the unit bid price for all depths and sizes, complete in place. The unit bid price shall include all labor, equipment, materials, time and incidentals necessary to complete the work.

#### (17) Connecting to Existing Service Saddle

Connecting to Existing Service Saddle, measured as prescribed above, will be paid for at the unit bid price, complete in place. The unit bid price shall include all labor, equipment, materials, time and incidentals necessary to complete the work.

#### (18) Service Saddle Installation

Service Saddle Installation, measured as prescribed above, will be paid for at the unit bid price for the indicated size regardless of depth, complete SP510 PIPE

in place. The unit bid price shall include all labor, equipment, materials, time and incidentals necessary to complete the work.

(19) Mid Span Restraint with Concrete Thrust Collar for Existing Water Line

Mid Span Restraint with Concrete Thrust Collar, measured as prescribed above, will be paid for at the unit bid price for the indicated size regardless of depth, complete in place. The unit bid price shall include all labor, equipment, materials, time and incidentals necessary to complete the work.

(20) Mid Span Restraint with Concrete Thrust Collar for Proposed Water Line

No separate payment will be made for Mid Span Restraint with Concrete Thrust Collar per "Special Detail – Concrete Thrust Collar" for proposed water line.

(21) Hand Excavation in Tree Root Protection Zone

No separate payment will be made for Hand Excavation in Tree Root Protection Zone.

#### Add the following pay items:

Payment will be made under:

Pay Item No.	Item Description	Unit
SP510-	Pipe, 2" Dia. HDPE DR9 Class 200 Type (all	Per
AW2HDPE-P:	depths), including Excavation and CLSM Backfill per	Linear
	Special Detail SD-3 (Water Service Tubing –	Foot
	Paved Area)	
SP510-	Pipe, 6" Dia. PVC C900 DR14 Type (all depths),	Per
AW6PVC-P:	including Excavation and <b>CLSM</b> Backfill per Special	Linear
	Detail SD-3 (Paved Area)	Foot
SP510-	Pipe, 8" Dia. PVC C900 DR14 Type (all depths),	Per
AW8PVC-P:	including Excavation and <b>CLSM</b> Backfill per Special	Linear
	Detail SD-3 (Paved Area)	Foot
SP510-	Pipe, 12" Dia. PVC C900 DR14 Type (all depths),	Per
AW12PVC-P:	including Excavation and <b>CLSM</b> Backfill per Special	Linear
	Detail SD-3 (Paved Area)	Foot
SP510-	Pipe, 16" Dia. PVC C900 DR14 Type (all depths),	Per
AW16PVC-P:	including Excavation and <b>CLSM</b> Backfill per Special	Linear
	Detail SD-3 (Paved Area)	Foot
SP510-	Pipe, 3/4" Dia. Copper K Type (all depths), including	Per
AW3/4CU-UP:	Excavation and Backfill per Standard Detail 510S-5	Linear
	(Private Lateral Service Tubing – Unpaved Area)	Foot

SPECIAL PROVISION SP510 PIPE

Pay Item No.	Item Description	Unit
SP510-	Pipe, 1.5" Dia. Copper K Type (all depths), including	Per
AW1.5CU-UP:	Excavation and Backfill per Standard Detail 510S-5	Linear
	(Pressure Monitoring Tubing – Unpaved Area)	Foot
SP510-	Pipe, 2" Dia. HDPE DR9 Class 200 Type (all	Per
AW2HDPE-UP:	depths), including Excavation and Backfill per	Linear
	Standard Detail 510S-5 (Water Service Tubing –	Foot
	Unpaved Area)	
SP510-	Pipe, 6" Dia. PVC C900 DR14 Type (all depths),	Per
AW6PVC-UP:	including Excavation and Backfill per Standard Detail	Linear
	510S-5 (Unpaved Area)	Foot
SP510-	Pipe, 8" Dia. PVC C900 DR14 Type (all depths),	Per
AW8PVC-UP:	including Excavation and Backfill per Standard Detail	Linear
	510S-5 (Unpaved Area)	Foot
SP510-	Pipe, 12" Dia. PVC C900 DR14 Type (all depths),	Per
AW12PVC-UP:	including Excavation and Backfill per Standard Detail	Linear
	510S-5 (Unpaved Area)	Foot
SP510-	Pipe, 16" Dia. PVC C900 DR14 Type (all depths),	Per
AW16PVC-UP:	including Excavation and Backfill per Standard Detail	Linear
	510S-5 (Unpaved Area)	Foot
SP510-LW:	Cut/Plug Existing Water Line (All Depths and Sizes),	Per Each
	including Excavation and Backfill, Complete-in-Place	
SP510-MW:	Connecting to Existing Service Saddle, including	Per Each
	Excavation and Backfill, Complete-in-Place (for	
	Pressure Monitoring)	
SP510-NW:	1.5" Service Saddle Installation, including Excavation	Per Each
	and Backfill, Complete-in-Place (for Pressure	
	Monitoring)	
SP510-OW:	Mid Span Restraint with Concrete Thrust Collar per	Per Each
	Special Detail – Concrete Thrust Collar "SD-B",	
	including Excavation and Backfill, Complete-in-Place	
	(for Existing Water Line)	

# SPECIAL PROVISION To Standard Specification Item No. 641S (Version 06/21/07) Stabilized Construction Entrance

For this project, Item No. 641S, Stabilized Construction Entrance, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this section of the City of Austin Standard Technical Specification are waived or changed.

#### 1. 641S.6 Payment

**Delete** the first sentence in its entirety

Replace with the following:

"The work performed and materials furnished and measured as provided under "Measurement" will be paid for at the unit bid price per each "Stabilized Construction Entrance".

Add the following pay item:

Payment will be made under:

Pay Item No.	Item Description	Unit
SP641S:	Stabilized Construction Entrance, Complete-in-Place	Per Each

## SPECIAL PROVISION To Standard Specification Item No. 803S (Version 11/15/2011) Barricades, Signs and Traffic Handling

For this project, Item No. 803S, Barricades, Signs and Traffic Handling, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this section of the City of Austin Standard Technical Specification are waived or changed.

#### 1. 803S.7 Payment

Add the following paragraph after the first paragraph to the Section 803S.7 Payment

No direct payment will be made for water filled barrier or other devices required to handle the traffic in conformance with the current edition of the Texas Manual of Uniform Traffic Control Devices for Street and Highways and as indicated on the Drawings or directed by the Engineer or designated representative, but will be considered as subsidiary to the "Barricades, Signs, and Traffic Handling" pay item.

#### **Add** the following pay item:

Payment will be made under:

Pay Item No.	Item Description	Unit
SP803S-MO:	Barricades, Signs, and Traffic Handling, Complete-in- Place	Per Month

## SPECIAL PROVISION To Standard Specification Item No. 862S (Version 05/05/2003) Temporary Removable Pavement Markings

For this project, Item No. 862S, Temporary Removable Pavement Markings, of the City of Austin Standard Technical Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this section of the City of Austin Standard Technical Specification are waived or changed.

#### 1. 862S.8 Payment

Add the following pay items:

Payment will be made under:

Pay Item No.	Item Description	Unit
SP862S-4TW:	4" White Temporary Removable Pavement Markings	Per Linear Foot

#### SPECIAL PROVISION

### To Division 16 – Electrical and Division 17 – Process Instrumentation and Controls System POTABLE WATER PRESSURE POINT STATION #31

For this project, Division 16 – Electrical and Division 17 – Process Instrumentation and Controls System, of the City of Austin Division 16 and 17 Sections are hereby amended with respect to the clauses cited below. No other clauses or requirements of the City of Austin Division 16 and 17 Sections are waived or changed.

#### 1. Measurement and Payment

#### **Add** the following Sections

Potable Water Pressure Point Station #31 will be measured per lump sum, complete in place as indicated on the Drawings and in the subject Sections herein.

Potable Water Pressure Point Station #31, measured as prescribed above, will be paid for at the unit bid price, complete in place. The unit bid price per lump sum shall include the following:

- Water meter box and lid per SPL WW-145A
- Ball valves per SPL WW-275
- Remote terminal unit (RTU) cabinet
- · Pressure transmitters
- Antenna and antenna pole
- Electric meter and load center
- Concrete foundations
- All conduit and wire
- All underground conduit and wire
- All the required appurtenances as indicated on the Drawings and in the subject Sections
- Removal of existing RTU cabinet, antenna and antenna pole, electric meter, electrical disconnect, underground conduit and wire, and all appurtenances and return to Austin Water
- Removal, and disposal of existing concrete foundations
- All labor, equipment, materials, time and incidentals necessary to complete the Potable Water Pressure Point Station #31 installation as indicated on the Drawings and in the subject Sections

#### **Add** the following pay item:

#### Payment will be made under:

Pay Item No.	Item Description	Unit
	•	Per Lump Sum
	Complete-in-Place	

## SPECIAL PROVISION To Specification Item No. 01901 (Version 08/29/2018) Scope of Work – Asbestos Abatement

For this project, Item No. 01901, Scope of Work – Asbestos Abatement, of the City of Austin Specifications is hereby amended with respect to the clauses cited below. No other clauses or requirements of this section of the City of Austin Specifications are waived or changed.

#### 1. 01901 Payment

**Add** the following pay items:

Payment will be made under:

Pay Item No.	Item Description	Unit
SP1901-1:	Mobilization for Licensed Asbestos Abatement Crew, including notification to state, per project, Complete-in-Place	Per Each
SP1901-2:	Asbestos Pipe Removal, Handling, Bagging, Labeling, Transportation, Disposal by Licensed Asbestos Abatement Personnel, and Compensation for Reduced Production by Pipe Laying Crew, Complete-in-Place	Per Working Day



#### SS0884.1 Description

Speed cushions are mounds of asphalt (Type D, Hot Mix Asphalt) placed in series across the width of the road. The speed cushions will be constructed according to the size below.

Type A – ten feet (10') long x six and one half feet (6.5') wide

The speed cushion is laid with the longest length parallel to the flow of traffic. Each speed cushion has a flat top in the center, with four sloped sides, those at each end are the approach and departure slopes, the other two are side slopes.

The design height of the flat top of the cushion is three inches (3"). Tolerances of  $+/-\frac{1}{4}$ " from the design height of 3" provide for a minimum height of two and three-quarter inches (2  $\frac{3}{4}$ "), and a maximum height of three and one-quarter inches (3  $\frac{1}{4}$ ").

The side edges are 18" wide, tapered to a slope of 1:6, and the approach and departure edges are 24" long, tapered to a slope of 1:8.

A keyway, a minimum twelve inches (12") wide and one inch (1") deep is required around the entire perimeter of the speed cushion, which can either be milled, or saw cut and excavated. Each speed cushion is temporarily marked with traffic marking tape, and permanently marked (after acceptance) with thermoplastic pavement markings and raised pavement markers

#### SS0884.2 Design and shape of cushions

<u>NOTE</u>. The design of the speed cushion is critical to the effectiveness of speed reduction and the safety of vehicles traversing it. It is essential that special care be given during the construction of the speed cushion to ensure the correct final shape and dimensions.

The CONTRACTOR is instructed to strive to provide consistency in height, shape, and dimensions of the completed speed cushions.

To achieve this consistency the CONTRACTOR shall utilize wood or steel templates, profiles, screed bars, box forms, spacer blocks or some alternative means, to ensure the speed cushion is the correct shape, height, and profile.

The method and process to be used by the CONTRACTOR to achieve the correct height, shape and profile shall be approved by the OWNER.

The CONTRACTOR is encouraged to use templates, profiles or string lines during, and at the completion of, construction of the speed cushion to satisfy the CONTRACTOR in the field that the completed cushions will meet the specification.

The OWNER requires a final survey of each speed cushion to verify that the cushions meet the specification for height and shape

The completed cushions should have a flat top height of 3". Any deviation from the 3" height, within the prescribed tolerance limits  $(+/-\frac{1}{4}")$ , is preferred to be on the positive side

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to achieve a desirable height of the cushion between the design height of 3" and the maximum height of  $3\frac{1}{4}$ ".

The approach and departure slopes shall be a straight 1:8 grade, 24" long. The side slopes shall be a straight 1:6 grade, 18" wide. For Type A cushions, this provides a flat-top outline 6'- 0" long and 3'- 6" wide.

The final shape of the cushion should have smooth surfaces and be without sharp corners and edges. Reference Section SS0884.3.1 below for suggested construction method.

Note that the final survey points to determine the completed height of the flat top of the cushion are taken at a location 2" inside the outline dimensions (6'- 0" x 3'- 6" for a Type A cushion) of the flat-top. The finished height of the flat-top at these point must be within the specified tolerances, minimum height of  $2 \frac{3}{4}$ " and maximum height of  $3 \frac{1}{4}$ ".

#### SS0884.3 Construction Process

The following is the process required for construction of a speed cushion:

- Layout of the speed cushion in the locations indicated by OWNER
- Inspection and approval of the locations by OWNER
- Survey of the existing road surface at the location of each cushion
- Install traffic control and warning signs
- Cut channel around perimeter of speed cushion
- Apply tack coat
- Lay and compact asphalt to construct the cushion
- Verify profile and height of cushion
- Place temporary markings
- Survey the completed speed cushions to verify profile
- Apply thermoplastic road markings and reflective raised pavement markers, if accepted by OWNER

#### SS0884.3.1 Suggested method of construction of Type A speed cushions

The <u>suggested</u> method of construction to achieve the desired height, shape, and profile of the Type A speed cushion is through the use of a square tubular steel box form, 3" high, with the dimensions of the basic rectangular shape of the center of the speed cushion, 6'- 0" long x 3'- 6" wide. The design of the form is described in 'A. Steel box form', below. This basic rectangular shape is constructed first and the approach, departure, and side slopes are added.

- The 3" high rectangular shape should be created by placing asphalt within the box form in 1½" maximum lifts, and compacting with a plate vibrator.
- After the box form is completely filled with compacted asphalt, the asphalt should be rolled with a vibrating tandem roller to ensure a compaction density of 91 - 96%. The height of the asphalt should be checked at regular intervals with a string line or straight edge, to ensure that the 3" thickness is being achieved.
- After the compacted asphalt has cooled sufficiently, the steel form should be removed leaving the asphalt "slab" (6'- 0" long x 3'- 6" wide x 3" high) of the center of the cushion.

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• Asphalt, to form the approach, departure, and side slopes, should be placed in maximum lifts of 1 ½" and compacted to a density of 91 - 96%.

- When the completed shape of the speed cushion is satisfactory, and the asphalt has cooled sufficiently to avoid deformation, the cushion should be finally compacted with a vibrating tandem roller to smooth any sharp corners and edges. The final survey points to determine the completed height of the flat top of the cushion are taken at a location 2" inside the outline dimensions (6'- 0" x 3'- 6") of the flat-top. The finished height of the flat-top at these point must be within the specified tolerances, minimum height of 2 3/4" and maximum height of 3 1/4".
- The completed cushion should be checked for height, shape, and dimensions using the profile board described in 'B. Profile Board' below.
- A. <u>Steel box form</u> the steel box form is made from 3" x 3" x ½" min. square tubular steel. The internal dimensions of the box form should be 6 feet in length and 3 feet 6 inches in width. (This is the size of the rectangular flat top of the speed cushion.). To allow the form to be easily removed from the asphalt "slab", the rectangular form is split diagonally into two 'L' shape parts. The ends of the 'L's should have welded lugs to allow the 'L's to be securely connected together to create the rectangle. The lugs can also be used to pin the forms to the existing road surface to prevent lateral movement.
- B. <u>Profile board</u> a profile board should be used to check the shape of the completed speed cushion. The profile board should be made from lumber, plywood, aluminum, etc and be of sufficient height and thickness that it is rigid. The board should be 6'- 8" wide, 2' wider than the width dimension of the cushion. The height of the board should be sufficient to provide rigidity and strength for handling, but not heavy enough to make it difficult to handle easily. A cut-out of the outline of the maximum dimensions of the cushion should be made at the bottom of the board, this cut out is the shape of a regular trapezoid.

The distance between the two parallel sides of the trapezoid should be 3  $\frac{1}{4}$ " (the maximum height of the speed cushion). The long side of the trapezoid, along the bottom of the board, is a width of 6'-6" (the overall width of the cushion) located centrally on the board, leaving 1" at each end, to create 'legs'. The short side of the trapezoid is 3'-6" (the width of the flat top of the cushion) also located centrally on the board.

The non-parallel sides of the trapezoid should be cut from points 1" from the outer corners of the profile board to points 3  $\frac{1}{4}$ " vertically and 19" horizontally from the outer corners. This should create equal and opposing angles of 10  $\frac{1}{4}$  degrees from the horizontal measured at the outside edges of the profile board.

The resulting trapezoidal opening in the profile board should fit over the speed cushion at all locations on the cushion when placed perpendicular to the traffic flow. The outer edges of the profile board, which should resemble 1" wide legs, should rest on the road surface.

If the profile board does not fit over the cushion when the two outer edges of the board are resting on the road surface, the speed cushion is higher than the required 3  $\frac{1}{4}$ " and does not met specification.

To determine if the cushion meets the minimum height of 2 3/4", measurements should be taken vertically from the top horizontal cut-out of the profile board to the flat top of the

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cushion. If this distance exceeds  $\frac{1}{2}$ ", then the flat top height of the cushion is below the required  $2\frac{3}{4}$ " and does not meet specification.

#### SS0884.4 Surveying

In order to verify the height and profile of the completed cushions, and to provide record information, a 'before' and 'after' survey of each cushion shall be made. Survey points on the existing road surface at the location of each cushion shall be established and elevations taken. Corresponding survey points shall be established after the cushion is completed and the elevation of those points taken to determine the height of the flat top, and the slope of the approach and departure ramps, of the of the completed cushion.

To verify the height and profile of the completed cushions the results of the surveys for each finished cushion shall be submitted to the OWNER for review.

For Type A Cushions, elevations shall be taken at the following 13 locations both <u>before and after</u> construction, for a total of 26 survey points.

- a. Five (5) survey points along the center line of the cushion:
  - i. 2 survey points, 12" from each end of the cushion
  - ii. 2 survey points, 26" from each end of the cushion
  - iii. 1 survey point, at the center, 60" from either end of the cushion
- b. Six (6) survey points, three (3) taken along a line 20" from each longitudinal edge of the cushion:
  - i. 2 survey points, 26" from each end of the cushion
  - ii. 1 survey point, at the center, 60" from either end of the cushion
- c. Two (2) survey points, one on each side, taken 9" from each longitudinal edge of the cushion at the center, 60" from either end of cushion.
- A. <u>'Before'</u> Before construction of the speed cushions is commenced the CONTRACTOR shall locate and mark the perimeter of each speed cushion. Using the outline the cushion, elevations of the existing road shall be taken at the 13 locations shown above.
- B. 'After' Elevations of each completed cushion shall be shall be taken at the same locations.

#### SS0884.5 Milling and Cutting

In order to provide a smooth transition between the speed cushion and the existing pavement surface, and to provide a key for the asphalt, a twelve inch (12") wide shallow keyway shall be cut in the existing pavement surface.

The keyway can be made by either:

 Milling with an appropriate type of milling machine to remove the existing asphalt surface to a depth of one inch (1"), around the complete perimeter of the speed cushion as shown on the drawings. The milling machine shall be capable of milling a minimum width of twelve inches (12") and shall be able to turn in tight corners. Any damage to water valve and water meters covers, manhole covers, and curbs and

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gutters by the milling machine shall be rectified by the CONTRACTOR at his expense.

• Excavating a twelve inch (12") wide channel to depth of one inch (1"). To ensure a clean edge to the keyway the asphalt surface around the entire inside edge of the channel should be saw cut before excavating. The saw cuts can be made not more than 7 days prior to the installation of the speed cushions.

#### SS0884.6 Tack Coat

The surface to which the tack coat is to be applied shall be thoroughly cleaned before application. The tack coat shall be applied to the complete area under the speed cushion. All contact surfaces of vertical faces of the existing pavement shall be painted with a thin uniform application of tack coat. During the application of the tack coat care shall be taken to prevent splattering of the adjacent pavement, curb and gutter and structures. All splatter shall be removed by the contractor, at his expense, before the work can be accepted.

#### SS0884.7 Asphaltic Concrete - Placement

Wood or steel templates, profiles, screed bars, box forms, spacer blocks or some other means shall be used to ensure the material will be laid to the correct shape, height, and profile. Reference Section SS0884.3.1, above, for the suggested method of construction

Carefully place materials to avoid segregation of the mix, do not broadcast the material. Remove any lumps that do not readily break down.

Spread all lifts in such a manner that, when compacted, the finished course will be smooth, of uniform density, and will be to the correct section, line and grades as shown on the drawings. Lifts should be placed as nearly continuously as possible.

#### SS0884.8 Asphaltic Concrete – Compaction

Rolling shall be carried out in accordance with Items No. 230S. The material shall be compacted thoroughly and uniformly to obtain a compaction density of 91- 96% and to profiles that meet the requirements of the drawings and specifications, before the material has cooled to temperature below 175 degrees F.

Rolling with a tandem or other steel-wheel roller shall be provided to compact the asphalt and to iron out any other roller marks. In locations inaccessible to rollers the material should be compacted with hand operated vibratory plates.

The edges of the speed cushion, adjacent to the existing roadway surface should be finished flush without any lips or ridges. The edge tapers should be smooth. The flat top of the speed cushion shall be smooth and flat with a maximum deviation in 10' of  $\pm 1/4$ .

#### SS0884.9 Markings

The permanent pavement markings shall be white reflective thermoplastic minimum one inch (1") deep is made around the entire perimeter. The keyway shall not be milled or excavated more than 24 hours prior to the installation of the speed cushion.

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The speed cushions shall be temporarily marked until such time the cushions are determined to meet specification. The permanent pavement markings shall be white reflective thermoplastic and include reflective raised pavement markers (RPMs). The markings comprise a white isosceles triangle with base length of three feet (3'), and a height of five feet (5').

The markings shall be set on the sloped face of the speed cushions to be seen by the approaching traffic and shall be located as follows:

Type A cushion – one triangle on the center line of the cushion

#### A. Temporary Markings

Immediately after construction of the cushions, and before the temporary traffic control devices have been removed and the street open to traffic, the cushions shall be marked with temporary markings.

The temporary markings shall comprise 4" wide white reflective temporary pavement marking tape laid to define the outline of the triangle marking. The layout of the triangles for the temporary markings shall comply with the pattern described above.

#### B. Permanent Markings

Permanent pavement markings shall comprise a solid white reflective thermoplastic triangle and include reflective raised pavement markers (RPMs) and shall be placed as soon as possible after the cushions have been accepted by the OWNER, following the survey verifying the profile and height of the cushions.

The solid thermoplastic triangles shall be laid in the same pattern as the temporary triangles, as described above. The temporary tape markings shall be removed from the cushion before the permanent thermoplastic markings are applied.

#### C. Permanent Raised Pavement Markers (RPMs)

The RPMs shall be provided as follows:

- on the base of the triangle at each corner and at the center, and shall have one white face toward the approaching traffic.
- at the apex of the triangle, shall be white/red and have the red face toward the opposing traffic flow.

#### SS0884.10 Warranty

The profile and height of the completed speed cushion shall meet the required specification. The OWNER requires that a survey of existing road surface and the completed cushion shall be submitted to verify the shape, profile and height. The height of the speed cushion shall be a minimum of two and three-quarter inches (2 %) and a maximum of three and one-quarter inches (3 %).

If the final shape, size, and dimensions of the speed cushion appears not to comply with the requirements of this specification, OWNER reserves the right to require the CONTRACTOR, at the CONTRACTOR'S expense, to demonstrate the requirements of the specification are met.

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If the speed cushion does NOT meet the specification, the speed cushion shall be removed and reconstructed at the CONTRACTOR'S expense.

#### SS0884.11 Measurement and Payment

Speed Cushions will be measured per each, for the indicated type and size, complete in place.

Speed Cushions, measured as prescribed above, will be paid for at the unit bid price, complete in place. The unit bid price per each Speed Cushions shall include the following:

- saw cutting, or milling, existing pavement
- excavation of asphalt pavement
- · removing existing speed cushions
- application of tack coat
- placing, rolling and compacting asphalt
- installing and maintaining temporary pavement marking tape
- · surveying the profile and height of the cushions
- cleanup
- all labor, equipment, materials, time and incidentals necessary to complete the Speed Cushions installation as indicated.

Application of the permanent thermoplastic pavement markings, and raised pavement markers will be separate bid items from Speed Cushions.

Payment will be made under:

Pay Item No.	Item Description	Unit
SS0884-A:	Speed Cushions, Asphalt, Type A - 10' long x 6.5' wide, Complete-in-Place	Per Each

#### **End**

<u>SPECIFIC</u> CROSS REFERENCE MATERIALS
Specification Item SS0884 Asphalt Speed Cushions

#### City of Austin Standard Specifications

<u>Designation</u>	<u>Description</u>
Item No. 230S	Rolling Flat Wheel
Item No. 301S	Asphalts, Oils, and Emulsions
Item No. 307S	Tack Coat
Item No. 340S	HMAC pavement
Item No. 862S	Temporary Removable Pavement Markings
Item No. 863S	Reflectorized Pavement Markers
Item No. 871S	Reflectorized Pavement Markings

#### **RELATED** CROSS REFERENCE MATERIALS

#### City of Austin Standard Specifications

Designation	Description
Item No. 824	Traffic Signs
Item No. 867S	Epoxy Adhesive

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#### SS1025.1 Definitions

This item shall govern the following:

**CONTRACTOR** means the individual, firm, corporation, or other business entity with whom the OWNER has entered into the Contract (as defined in Section 700).

**Distribution Line** means a water line installed to transport water from a water main located within a public right-of-way or easement.

*Improvements* means any structure on Customer's Premises to which a Private Lateral will be connected.

**OWNER** means the City of Austin, Texas, a municipal corporation, home rule city and political subdivision organized and existing under the laws of the State of Texas, acting through the City Manager or his/her designee, officers, agents or employees to administer design and construction of the Project (as defined in Section 700).

**Premises** means Customer's property on which a Private Lateral will be relocated.

**Private Lateral** means a water line installed on private property that connects the Improvements on the Premises to the OWNER's Distribution line.

#### SS1025.2 References

- A. 2021 Uniform Plumbing Code
- B. City of Austin Plumbing Code
- C. City of Austin Standard Detail "520-AW-01A and 520-AW-01B"
- D. City of Austin Standard Specification "510 Pipe"

#### SS1025.3 Description

This item shall govern the following:

- A. All coordination as described in Section SS1025.4.
- B. Locating the existing Private Lateral on the premises between the improvement and the property line and obtaining all necessary elevation information from this line to develop a new water Private Lateral design.
- C. Designing, permitting, furnishing, installing and testing a new water Private Lateral on private property with all necessary fittings between the existing improvements and the new water Private Lateral at the property line of the premises. The plumber must be licensed by the State of Texas and registered with the City of Austin. All work on private property must meet the City of Austin Plumbing Code.
- D. Notifying the property owner of the proposed water Private Lateral design at least five (5) working days prior to submitting the design to the City of Austin for approval.

- E. Obtaining approval for the new water Private Lateral design from an authorized City of Austin Building/Plumbing Inspector.
- F. Disconnecting all improvements from the existing Private Lateral and immediately reconnecting these improvements to the new Private Lateral and private distribution and water main.
- G. Proper abandonment of the existing Private Lateral after the new Private Lateral is in service. Abandonment shall be considered to be, at a minimum, flushing, cutting and plugging of the existing Lateral, per City of Austin standards.
- H. All required submittals as described in Section SS1025.5.

#### SS1025.4 Coordination

The CONTRACTOR shall be responsible for the following:

- A. Coordinating all permit and inspection requirements between the plumber(s) and the City of Austin Building/Plumbing Department and Austin Water.
- B. Coordinating all work between the CONTRACTOR, subcontractors performing water improvements for this project within City of Austin Right-of-Way or Easement Areas and the licensed plumber(s) performing water Private Lateral relocation work on private property.
- C. Coordinating all work between the plumber(s) and property owner(s) and providing the property owner with appropriate notice and information about the Private Lateral work. CONTRACTOR shall provide written notice to each property owner at least 30 working days prior to work affecting the Private Lateral. CONTRACTOR shall submit to the property owner a proposed design for each residence connected under the Contract. EACH SKETCH SHALL BE SUBMITTED TO THE OWNER FIVE (5) WORKING DAYS PRIOR TO PERMITTING THE DESIGN AND BEGINNING CONSTRUCTION ON THE PREMISES.
- D. Coordinating all work between the plumber(s), OWNER's Construction Inspector and OWNER's Building/Plumbing Inspector. All work performed on private property must be done in the presence of the OWNER's Construction Inspector or OWNER's Building/Plumbing Inspector.

#### SS1025.5 Submittals

The CONTRACTOR shall be responsible for the following submittals in accordance with Section 1300:

- A. Plumber(s) License and Registration:
  - A copy each of both the plumber's license from the State of Texas and registration with the City of Austin. The license and registration must be current, active and in good standing. This is required for each plumber.
- B. Photographs and Videotape:

 A copy of all photographs and videotapes required under Section SS1025.6 will be submitted to the OWNER's REPRESENTATIVE in accordance with the submittal process.

#### C. Private Lateral Plumbing Design:

- A copy of the letter notifying the property owner of the proposed Private Lateral plumbing design shall be submitted to the OWNER's REPRESENTATIVE in accordance with the submittal process prior to beginning any construction on the premises.
- A copy of all plumbing design approved and permitted by the City of Austin shall be submitted to the OWNER's REPRESENTATIVE in accordance with the submittal process prior to beginning any construction on the premises.

#### D. Building/Plumbing Permit:

 A copy of all building/plumbing permits from the City of Austin shall be submitted to the OWNER's REPRESENTATIVE in accordance with the submittal process prior to beginning any construction on the premises.

#### E. Property Owner Notification:

 A copy of all notification letters sent to the property owner as required in Section SS1025.4.

#### F. As-built with Certification Letter:

A copy of all as-builts with certification letters for all approved Private Lateral plumbing work shall be submitted to the OWNER's REPRESENTATIVE in accordance with the submittal process prior to application for payment for any construction on any private premises. The certification letter must state that all work was performed by a licensed plumber, meets City of Austin Plumbing Code and was inspected and approved by a City of Austin Building/Plumbing Inspector. The Inspection Approval Letter shall be attached. The certification letter must be certified by the licensed plumber. PAYMENT FOR A COMPLETELY CONNECTED RESIDENCE SHALL NOT BE MADE UNTIL AN AS-BUILT SKETCH WITH CERTIFICATION LETTER FOR THAT RESIDENCE HAS BEEN SUBMITTED. Such sketches may be red-lines of the permitted Private Lateral Plumbing Design. The as-built sketches shall, at a minimum, identify all installed lengths of pipe, meter box locations, points of intersections (PIs), fittings, adapters, concrete supports, distances from permanent structures such as house slabs, pools, sheds, etc. and any other information that may assist the home owner in identifying the Private Lateral location at a later date. The CONTRACTOR shall review each as-built sketch with the OWNER's Construction Inspector and OWNER's Building/Plumbing Inspector prior to submitting to the OWNER's REPRESENTATIVE. acceptance, the OWNER's Construction Inspector shall provide each property owner with a copy of the as-built with certification letter.

#### SS1025.6 Photographs and Videotape

A. Prior to initiating any construction at a residence, CONTRACTOR shall document preconstruction conditions of each residence by use of a digital camera. A minimum of five digital exposures of each residence shall be taken, or otherwise an adequate number, to fully document all landscaping, residential features and existing conditions along the entire connection alignment of each residence that may be affected during construction. A copy of all such documentation shall be provided in electronic format, in accordance with Section 01380 (Construction Photographs), to the OWNER's REPRESENTATIVE prior to initiating any construction at a residence.

B. A video of each property showing the proposed Private Lateral alignment shall be taken prior to beginning any construction on private property. A copy of the all such documentation shall be provided to the OWNER's REPRESENTATIVE prior to initiating any construction at a residence. An additional video shall be taken along the same route following completion of the fieldwork, but prior to final acceptance of project. Both the initial and final videos shall show details of all objects within and in close proximity of the construction work area, with particular attention to landscaping, trees, plants, shrubs, sidewalks, pavement and other surface features. Videos shall also be taken of all staging and storage areas used on the premises. A copy of the all such documentation shall be provided to the OWNER's REPRESENTATIVE prior to final acceptance of project.

#### SS1025.7 CONTRACTOR Responsibilities

- A. All building/plumbing permits as described in Section 00810 of the Contract Documents.
- B. The CONTRACTOR shall perform all work within public right-of-ways and easement areas. The CONTRACTOR shall be responsible for the distribution lines and Private Lateral between the distribution line and the property line, including all fittings at the property line.
- C. The CONTRACTOR shall have a licensed plumber design and perform all work on private property between the new water Private Lateral at the property line and the improvements on the premises. This Work shall include supplying and installing valves, pipe, fittings, meter box, concrete supports, and other appurtenances necessary to complete the Work. The plumber must be licensed by the State of Texas and registered with the City of Austin.
- D. All work on private property must meet the City of Austin Plumbing Code.
- E. All work shall be inspected and approved by the OWNER's Water Plumbing/Building Inspector. A new Private Lateral shall not be used until this Plumbing/Building Inspector grants approval in writing. The CONTRACTOR shall coordinate all required inspections.
- F. No Private Lateral shall be relocated or connected to a new distribution line until the OWNER's Construction Inspector has approved the new distribution line for use.
- G. No segment of an existing distribution line shall be abandoned until after all Private Laterals connected to this segment of the existing distribution line are relocated and connected into the new distribution line, all relocated Private Laterals have been approved by the OWNER's Plumbing/Building Inspector, and all relocated Private Laterals are fully active on the new distribution line.

#### SS1025.8 Private Lateral Requirements

A. All Work under this Contract must comply with the City of Austin Plumbing Code as referenced in Section SS1025.2, all applicable rules, codes and regulations of the Texas

Commission on Environmental Quality (TCEQ) for water service connections. Formal certifications letters that line installations, Private Lateral connections and Private Lateral abandonment were completed in compliance with the City of Austin Plumbing Code and all applicable rules, codes and regulations, shall be submitted for each residence so connected under the Contract as required in Section SS1025.5 (F).

- B. Each new Private Lateral must pass the Pressure Pipe Hydrostatic Testing, as described in City of Austin Standard Specification 510.3 (Pipe), Section 27.
- C. Restoration shall be an on-going process during construction operations and shall immediately follow completion of construction for each residence.

#### SS1025.9 Maintaining Water Service to Residences

CONTRACTOR shall ensure that no improvement is without water service at any time except for the minimum time required to make the formal reconnection from the existing Private Lateral to the new Private Lateral. During the reconnection of the existing Private Lateral to the new Private Lateral, the CONTRACTOR shall specifically coordinate with the property owner and tenant(s), and OWNER's Construction Inspector to minimize any inconveniences to the resident(s) and, to the full extent possible, limit the length of time the residence is out of water service to no more than two to three hours. Upon completion of the connection, the CONTRACTOR shall immediately notify the property owner and resident(s) that water service has been restored.

#### SS1025.10 Right of Entry Agreement

The OWNER will be responsible for obtaining a Right of Entry Agreement from each property owner. The Right of Entry Agreement authorizes the CONTRACTOR to relocate the Private Lateral on the premises. A copy of the Right of Entry Agreement documents will be provided to the CONTRACTOR.

#### SS1025.11 Measurement and Payment

Private Lateral Relocation, when so called for in the design or specifications, will be measured per each; for the size, type and class specified in the 2021 Uniform Plumbing Code, as adopted and amended by ordinance for the City of Austin, including excavation and backfill, complete in place.

Private Lateral Relocation, measured as prescribed above, will be paid for at the unit bid price, complete in place. The unit bid price shall include valves, pipe, encasement pipe, fittings, meter box, other necessary appurtenances, bedding material, disposal of surplus material, pressure testing, abandonment of existing Private Lateral, landscape restoration, cleanup, all labor, equipment, materials, time and incidentals necessary to complete the work, and one year warranty.

PAYMENT FOR A COMPLETELY CONNECTED RESIDENCE SHALL NOT BE MADE UNTIL AN AS-BUILT SKETCH WITH CERTIFICATION LETTER FOR THAT RESIDENCE HAS BEEN SUBMITTED AS DESCRIBED IN SECTION SS1025.5 (F).

Payment will be made under:

### SPECIAL SPECIFICATIONS SS1025

### PRIVATE LATERAL RELOCATION

Pay Item No.	Item Description	Unit
SS1025-W:	Private Lateral Relocation, including Excavation and Backfill, Complete-in-Place	Per Each

#### PART 1 GENERAL

#### 1.01 SUMMARY

This section includes the supply and installation of new pipeline by trenchless horizontal directional drilling methods for potable water line installations. Directional drilling equipment and any supporting equipment for directional drilling operations shall be selected by the CONTRACTOR subject to the minimum requirements specified herein.

This specification describes those requirements for the installation of a HDPE pipeline crossing Walnut Creek in Austin, TX using the trenchless construction process called Horizontal Directional Drilling.

- A. The CONTRACTOR shall provide all labor, machinery, construction equipment and materials to perform the items herein specified.
- B. The CONTRACTOR shall perform the following tasks:
  - 1. Transport all equipment, labor, consumables, and materials to and from the job site.
  - 2. Prepare and maintain the site including entry and exit areas as defined by the Drawings and as specified herein.
  - 3. Perform Horizontal Directional Drilling operations including the drilling of a pilot hole and reaming of the pilot hole to a suitable diameter for the installation of a 20-inch and 12-inch outside diameter HDPE pipe (DIPS).
  - 4. Disposal of the excavated material.
  - 5. Prefabrication of the pull section.
  - 6. Hydrostatic testing the prefabricated pipe pull section before installation and after installation.
  - 7. Installation of the prefabricated pipe pull section along the reamed hole.
  - 8. This work shall include all services, equipment, materials supply, and labor as required for the complete installation, testing, environmental protection, clean-up, restoration of underground utilities and perform final restoration of all work and impacted areas.

#### C. Related Sections

- 1. Geotechnical Investigation and Data Report, Springdale/US290 Improvements, Austin, Texas.
- 2. Geotechnical Baseline Report, Springdale/US290 Improvements, Austin, Texas.

#### 1.02 REFERENCES

The following references form part of this Specification, in case of conflict between the requirements of this Specification and those of the listed documents, the requirements of this Specification shall prevail. The latest edition of the following references shall apply:

- API Bulletin 5D Specification for Drill Pipe
- API Bulletin 5C2 Performance Properties of Casing, Tubing, and Drill Pipe
- API Bulletin D20 Directional Drilling Survey Calculations Method and Terminology

- API Recommended Practice 7G Drill Stem Design and Operating Limits
- ASTM D 3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR)
   Based on Controlled Outside Diameter
- ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Butt Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- ASTM D 3350 Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
- ASTM F 714 Standard Specification for Polyethylene (PE) Pipe (SDR-PR) Based on Outside Diameter
- ASTM F 1055 Standard Specification for Electrofusion Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing
- ASTM F 1962 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings
- ASTM F 2620 Standard Practice for Heat Fusion of Polyethylene Pipe and Fittings

#### 1.03 SYSTEM DESCRIPTION

- A. Pipeline Installation: The pipeline crossing will be installed by Horizontal Direction Drilling, a trenchless construction technique for installing pipelines in three phases. The first phase consists of drilling a small diameter pilot hole along a designated path. The second phase consists of reaming the pilot hole to a diameter suitable for installation of the pipe, and the third phase consists of pulling the pipe into the enlarged hole. The method is accomplished using a surface launched horizontal directional drilling rig with ancillary tools and equipment.
- B. The CONTRACTOR shall assume responsibility for the stability and accuracy of the drilled and reamed hole and pits constructed, and all costs for damages resulting from any failure thereof. The CONTRACTOR shall be solely responsible for the safety of the personnel engaged in underground construction throughout the duration of the work.
- C. The general dimensions, arrangement and details for the drilled hole shall be as indicated on the Drawings.
- D. Methods of excavation, selection of HDD equipment and procedures for the horizontal directional drilling operation shall be selected by the CONTRACTOR to provide adequate working space and clearances for the work to be performed.
- E. Pit excavation methods, ground water control, and pit support techniques (if applicable) shall be selected by the CONTRACTOR.
- F. Applicable Regulations and Codes: Work covered by this section shall be performed in accordance with local, state, and federal codes and laws which pertain to such work and supplemental regulations which are contained in these specifications. In case of conflict between these specifications and codes or laws, the most stringent shall govern.

#### 1.04 SUBMITTALS

The CONTRACTOR shall submit the following as required in accordance with Section 01300. Mobilization shall not commence until the CONTRACTOR has received a favorable disposition (i.e. "no exceptions taken") on all of the submittals. The Qualifications shall be submitted 14 days after notice to proceed. The Work Plan and Material submittals shall be

submitted within 30 days after notice to proceed. The Daily Logs shall be submitted daily during construction the next business day.

- A. Calculations signed and sealed by a Texas Registered Professional Engineer. The CONTRACTOR shall retain a Texas-licensed Professional Engineer to prepare the Work Plan and Calculations. On City-funded projects, the CONTRACTOR must follow qualifications-based procedures to procure the required Professional Engineering Services, according to Chapter 2254 of the Texas Government Code. Horizontal directional drilling shall not commence until the CONTRACTOR has received a favorable disposition (i.e. "no exceptions taken") for all design calculation submittals.
- B. The CONTRACTOR shall supply calculations to support the required submittals for horizontal directional drilling. At a minimum, the following calculations should be included:
  - 1. Maximum Allowable Pipe Loading limits.
  - 2. Pullback load calculation based upon proposed drill path plan and profile.
  - 3. Buoyancy effect calculations.
  - 4. Effects of ballasting plan on pipe pullback forces.
  - 5. Inadvertent Return analysis (sometimes referred to as hydro fracture analysis). This should include a maximum annular pressure curve and the respective formation pressure versus bore depth based on the proposed drill plan and profile.
  - 6. Confirmation that the design parameters do not exceed predicted installation stresses including factors such as tensile load, buckling and deformation.

#### C. Shop Drawings

- 1. A scaled, detailed site plan detailing the following:
  - a. Entry Area
  - b. Exit Area
  - c. Pipe lay down area
  - d. Any other off-site areas that will be utilized. Any off-site areas will have to be added by General Permit correction prior to any work being performed.
- 2. A detailed drawing(s) showing the proposed horizontal and vertical directional drilling installation routes for review by the ENGINEER. The drawing(s) shall be provided at a scale of 1"=40' horizontal and 1"=10' vertical. No drilling shall be undertaken until the CONTRACTOR has received written acceptance of the drill route submittal from the OWNER.
- D. Material: Specifications on materials to be used shall be submitted to Engineer. Material shall include the HDPE pipe, fittings and any other item which is to be an installed component of the project. Specifications shall include material type, material class, yield strength, allowable pipe pulling force, diameter, and wall thickness.
- E. Quality Assurance/Control Submittals
  - 1. Reports
    - a. CONTRACTOR shall maintain a complete set of project records at the job site or field office.
    - b. Daily Logs

- 1) CONTRACTOR shall maintain a daily activity log during Horizontal Directional Drilling operations. A sample of the log format shall be submitted to the ENGINEER for approval prior to the commencement of drilling operations.
- 2) The daily log shall be submitted to the ENGINEER for records purposes on a daily basis. The log shall note the following for each drill rod added or withdrawn:
  - Start and finish time for each section of drill pipe that is added or taken away for pilot hole drilling, reaming and final pipe pullback.
  - For pilot hole drilling, drill bit location at least every 30 ft. along the drill path.
     CONTRACTOR shall mark the drawings on a daily basis with drilling progress or provide electronic progress report along drill path.
  - General description of ground condition.
  - Details and perceived reasons for delays greater than one hour other than normal breaks and shift changes.
  - Details of any unusual conditions or events.
  - Downhole tools and equipment in use.
  - Description of drilling fluid returns. This shall include the drilling fluid unit weight and viscosity as measured by a marsh funnel. The marsh funnel test shall be taken every 6 hours during the pilot boring and once daily through the end of final pipe pullback.
  - Drilling fluid pumping rate, average, at the drilling machine.
  - Downhole fluid pressures, maximum and average.
  - Drill stem torque at the drilling machine, maximum and average.
  - Pull back tensile forces during pipe pullback measured at the drilling machine, maximum and average.
- 3) Production of As-built Drawings: The CONTRACTOR shall maintain at the construction site a complete set of field drawings for recording the as-built conditions. The CONTRACTOR shall plot as-built conditions on the field drawings, including the location in plan (either X/Easting and Y/Northing or Baseline Distance and Offset) and elevation at the completion of each shift.

#### F. Statements

- a. Certification of training stating that the drill and drill guidance equipment operators have been trained in the use of the proposed equipment by an authorized representative of the equipment manufacturer(s) or training agents. Training received more than three years prior shall not be considered current.
- b. Certification of the HDPE fusion operator (by ISCO, MCElroy, or equal). Training received more than three years prior to operation of the fusion equipment shall not be considered current.

#### G. Equipment:

1) Technical specifications and manufacturer of Horizontal Directional Drilling system.

- Date of manufacture of the Horizontal Directional Drilling system and number of operating hours, with a statement that the equipment has been maintained in accordance with the manufacturer's recommendations.
- 3) Technical specifications and manufacturer for downhole drilling assembly and reaming equipment.
- 4) Date of manufacture and purchase of drilling assembly.
- 5) Technical specifications and manufacturer for guidance and control system and verification of the calibration of down hole survey equipment prior to the commencement of drilling.
- 6) Technical specifications and manufacturer for solids separation and drill fluid recirculation systems.
- 7) The CONTRACTOR shall provide the make, model and technical specifications for each of the following: downhole pressure measuring device, pullback tension measuring device, pulling head, swivel, rollers, pipe fusion equipment and pipe fusion data logger.
- H. Methods and Work Plan CONTRACTOR shall supply full details of the procedures and resources which will be employed to carry out the work including method and sequence of:
  - Drilling Operations: number and size of construction crew, hours to be worked, pilot hole drilling procedure, reaming procedure, method of monitoring the drilling head, method of verifying pipe location for as built drawing and schedule for completing major activities.
  - Pipeline Assembly and Installation: number and size of construction crew, assembly procedure, welding procedure for product pipe, and installation / pullback procedure.
  - 3) Material Safety Data Sheets (MSDS) for drilling fluids and solids.
  - 4) Spoil separation and disposal.
  - 5) Buoyancy Control.
  - 6) Contingency Plans.
    - Contingency plan for identifying, locating, and containing inadvertent drilling fluid returns.
    - Investigation boreholes along the alignment have been abandoned as reported in the Geotechnical Report. The CONTRACTOR's work plans shall address the risk that all investigation boreholes may contribute to the risk of drill fluid loss.
    - The CONTRACTOR shall submit a contingency plan to address procedures to be employed in the event any of the listed items occur.
      - Utility strike, obstruction, or inability to advance drill pipe.
      - Deviation beyond allowed line and grade tolerances.
      - Inability to move pipe through borehole during pullback.
      - Damage to other existing utilities.
      - Ground heave or settlement of roadways, earth and structures within 50' of alignment.

7) Schedule. Submit a schedule of directional drilling related operations commencing with the mobilization of the drilling equipment on site, include anticipated start dates of major milestones including mobilization, pilot bore, reaming and pipe pullback and terminating on restoration of pit sites through backfilling, grading, and revegetation. The schedule shall consider the overall project requirements and anticipated subsurface conditions as described in the Subsurface Investigation and Geotechnical Data Report and the Geotechnical Baseline Report prepared for this project.

## I. Closeout Submittals

The CONTRACTOR shall keep and maintain at the construction site a complete set of field drawings for recording the as-built conditions. It shall be marked or noted thereon all field information, properly dated, recording up-to-date as-built conditions including the plot of the pipe installation. The CONTRACTOR shall sign the "As-Built" drawings and provide to the ENGINEER at the end of construction.

## 1.05 QUALITY ASSURANCE

- A. Qualifications: The CONTRACTOR's project manager, superintendent and driller operator assigned to this project must be experienced in work of this nature and must have successfully completed similar project using Horizontal Directional Drilling. Work experience shall include successfully completed similar projects using horizontal directional drilling in the last 5 years.
- B. The CONTRACTOR shall maintain a quality-assurance program to ensure that minimum standards are met.
- C. The CONTRACTOR shall provide the ENGINEER and OWNER's Representative with inspection access to piping during all phases of fabrication and/or installation, and shall provide proper facilities for such access and inspection.
- D. Trenchless CONTRACTOR to have successfully installed at least (3) horizontal directional drill projects with pipe of a similar diameter and length to the proposed project within the past three years.
- E. The trenchless CONTRACTOR shall submit the following information for each reference project:
  - Name, location and general description of project including ground conditions encountered.
  - Contact name, position, address and telephone number of project reference.
  - Contract value, start and completion date.
  - Length, pipe material and diameter of the HDD/Bore(s).

## 1.06 PROJECT / SITE CONDITIONS

- A. The CONTRACTOR's schedule shall consider the overall project requirements and anticipated ground conditions as described in the Geotechnical Baseline Report for the Springdale/US290 Improvements, Austin, Texas. CONTRACTOR's selection of inadequate, inappropriate, or inefficient equipment and methods will not be cause for adjustments to the contract price or time.
- B. Utility Protection:

- 1. Utility lines and structures indicated on the Drawings which are to remain in service shall be protected by the CONTRACTOR from damage as a result of the operations. Where utility lines or structures not shown on the Drawings are encountered, the CONTRACTOR shall report them to the OWNER before proceeding with the Work. The CONTRACTOR shall bear the cost of repair or replacement of any utility lines or structures, shown in the drawings, marked by "One-Call" services, or located in the pre-drilling utility location activity, which are broken or damaged by the CONTRACTOR's operations.
- 2. Pre-drilling utility location activity. CONTRACTOR shall take the following steps prior to commencing drilling operations in a location which might contain underground facilities:
  - a. Contact the utility or utility location/notification service for the construction area.
  - b. Positively locate, through potholing or other non-destructive excavation means (for example: hand excavation), and stake all existing lines, cables, or other underground facilities including exposing any facilities which are located within 10 feet of the designed drilled path.
  - c. Adjust planned drilling practices and downhole assemblies to prevent damage to existing facilities.

## 1.07 SYSTEM STARTUP

The pipe shall be tested in accordance with the Specification 510.

#### PART 2 PRODUCTS

## 2.01 MATERIALS

- A. Pressure Pipe: The HDPE pipe will be installed using Horizontal Directional Drilling.
  - The material shall be listed by the Plastics Pipe Institute (PPI), a division of The Society
    of Plastics Industry, in Report PPI TR-4. The pipe material shall have a Hydrostatic
    Design Basis (HDB) of 1,600 psi at 73 deg F and 1,000 psi at 140 deg F. Testing and
    validation samples of the pipe manufacturer's production pipe shall be based upon
    ASTM D2837 and PPI TR-3.
  - Pipe and fittings shall be PE4710 Polyethylene and shall have a minimum cell classification of 445474C or higher per ASTM D3350. Pipe shall be manufactured in accordance with ASTM F714.
  - 3. The polyethylene pipe manufacturer shall provide certification that stress regression testing has been performed on a sample from the same lot from which the supplied pipe comes. The stress regression testing shall have been performed in accordance with ASTM D2837, and the manufacturer shall provide a report as described in that specification.
  - 4. Pipe supplied under this specification shall have a nominal Ductile Iron Pipe Size (DIPS) outside dimeter and a Dimension Ratio (DR) of 9. To maintain the pressure rating of 200 psi at 73° F, fittings shall have a DR of 7.
  - 5. The pipe and fittings shall carry the same pressure rating. All fittings shall carry a minimum pressure rating of 200 psi. At the point of fusion, the outside diameter and minimum wall thickness of the fitting shall match the outside diameter and minimum wall thickness specifications of ASTM F714 for the same size pipe to which it is joined. The manufacturer of the fittings shall be the same as the manufacturer of the pipe.

- 6. Fittings shall be factory manufactured
- 7. HDPE piping shall be permanently marked with continuous, highly visible, blue stripes at each of the four quadrants.
- B. Electrofusion couplings: Couplings shall meet the requirements of ASTM F 1055. Specimens shall be conditioned prior to joining at the minimum or maximum pipe temperature allowable for fusion. The fittings shall be subjected to testing to determine conformance to minimum hydraulic burst pressure, sustained pressure, tensile strength, impact resistance, and joint integrity requirements. Fusion evaluation test for fitting failure and evaluation for voids shall also be conducted. Couplings shall be manufactured by Central Electrofusion Products, Friatec Electrofusion Products, or approved equal.
- C. Drilling Fluids: The CONTRACTOR shall use a high quality bentonite drilling fluid or equivalent to ensure hole stabilization, cuttings transport, bit and electronics cooling and hole lubrication to reduce drag on the drill pipe and the product pipe. Oil based drilling fluids or fluids containing additives that can contaminate the soil or ground water will not be considered acceptable substitutes. Composition of the fluid must comply with all applicable local, state and federal environmental regulations.
  - 1. Drilling fluids may be mixed with potable water or reclaimed water. If reclaimed water is used, ensure no contamination is introduced during the drilling, reaming or the pipe installation process.
  - 2. Disposal of drilling fluids shall be the responsibility of the CONTRACTOR and shall be conducted in compliance with environmental regulations, right-of-way and work space agreements, and permit requirements. Waste cuttings and drilling mud shall be dewatered and dried by the CONTRACTOR to the extent necessary for disposal in offsite landfills or other final location acceptable to the ENGINEER.
  - 3. Drilling fluid returns can be collected in the entrance pit, exit pit or spoils recovery pit. The CONTRACTOR shall immediately clean up any drilling fluid spills or overflows from these pits.
- D. Water: CONTRACTOR is responsible for obtaining, transporting and storing any water required for drilling fluids.

## PART 3 EXECUTION

#### 3.01 EXAMINATION

CONTRACTOR shall be responsible for examining the site and geotechnical data prior to bidding and executing the work.

## 3.02 PREPARATION

The CONTRACTOR shall prepare and maintain the site in accordance with the drawings, and as specified herein.

#### 3.03 ENVIRONMENTAL REQUIREMENTS

A. The Horizontal Directional Drilling operation will be a closed system to eliminate the discharge of water, drilling mud and/or cuttings to nearby land areas involved in the construction process. CONTRACTOR shall provide equipment and procedures to maximize the recirculation of drilling mud and to minimize waster. CONTRACTOR shall provide solids

- control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.
- B. Waste cuttings and drilling mud shall be dewatered and dried by CONTRACTOR to the extent necessary for disposal in offsite landfills. Water from the dewatering process shall be treated by CONTRACTOR to meet Chapter 15-10 of the Austin City Code if disposed of to the City Sanitary sewer system. Disposal to the surface is not allowed nor is discharge to any natural drainage way. If CONTRACTOR uses a third party disposal firm, CONTRACTOR shall provide a copy of that firm's current permit to the OWNER.
- C. "Hydro-fracs" or inadvertent returns of drilling fluid to the surface must be contained immediately and the surface area promptly washed and returned to original condition. CONTRACTOR shall continuously monitor drilling operations to minimize the impact of flow holes or breakouts of drilling fluids. Drilling operations shall be discontinued if such "hydro-fracs" or inadvertent returns occur, until fluids can be contained and disposed. Upon stoppage of work due to "hydro-fracs" or inadvertent returns of drilling fluids, CONTRACTOR shall execute the previously submitted plan for clean-up and disposal of drilling fluids. Equipment and materials for cleanup and contingencies shall be provided by CONTRACTOR and stored at all sites.
- D. Construction related activities involving fuels and lubricants such as vehicle refueling and equipment maintenance, including the draining and pumping of lubricants shall be conducted at sufficient distance from the water channel to eliminate contamination in case of a spill. Any fuels or lubricants spilled shall be cleaned up immediately to the extent that no residuals remain on, in, or under the surface.
- E. Rubbish and debris shall be removed from the job site as the work progresses. Construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition. Excavations shall be backfilled and revegetated with the seed/fertilizer/erosion control mix described elsewhere in these specifications.
- F. CONTRACTOR shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations CONTRACTOR shall place hay bales, or approved protection, to limit intrusion upon protect area. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. CONTRACTOR shall adhere to all applicable environmental regulations including environmental condition stated in local, state and federal permits Fuel may not be stored in bulk containers (greater than 25 gallons) within 200' of any water-body or wetland.

## 3.04 CONSTRUCTION

## A. MOBILIZATION

- General: The CONTRACTOR shall mobilize all necessary personnel, equipment and materials to construct entry and exit areas for drilling operations as shown on the Drawings. The CONTRACTOR may submit alternative arrangements for utilizing the entry and exit areas. CONTRACTOR shall provide appropriate supports to maintain safe working conditions; ensure stability of the entry, exit, settlement and containment pits; minimize loosening, deterioration and disturbance of the surrounding ground.
- 2. Rig Side of Installation: The CONTRACTOR shall set up the temporary work area in the space shown on the Drawings. Any grading shall be compacted with slopes no greater than one vertical to two horizontal. The site shall contain the horizontal directional

drilling rig, drill pipe storage racks, water and slurry pumps, slurry mixing tank, cuttings separation equipment, primary settlement and containment pits or storage containers, dry storage area for bentonite, and crane. All pits shall be lined with heavy plastic sheeting with sealed joints to contain drilling mud and cuttings and to minimize water infiltration.

- 3. Pipe Side/Exit of Installation: The CONTRACTOR shall construct a temporary work area in the space shown on the Drawings. The pipe side/exit shall contain a cuttings settlement pit or cuttings settlement container, exit point slurry containment pit/container and cuttings separation equipment. All pits shall be lined with heavy plastic sheeting with sealed joints to contain drilling mud and cuttings and to minimize water infiltration.
- 4. A pipe launcher/roller system shall be assembled by the CONTRACTOR in the specified area. The pipe shall be strung across the rollers with plywood under the rollers to protect the underlying grass.

## B. DRILLING

- General: CONTRACTOR shall supply all necessary drilling equipment for completing the installation as shown in the Drawings. This shall include, but not be limited to horizontal directional drilling rig, drill pipe, drilling fluids, water, drilling motors, reaming cutters, slurry mixing equipment, cuttings separation equipment, spare parts, downhole survey equipment and office equipment.
- 2. Directional Drilling Alignment and Profile: The plan and profile for the horizontal directional drilling operation shall be in accordance with the Drawings unless otherwise approved by the ENGINEER. CONTRACTOR may submit an alternate alignment profile for consideration by the ENGINEER. The proposed profile for each crossing must stay within the specified easements and maintain minimum ground cover to help ensure no drilling fluid breakout.
- 3. Drill Entrance and Exit Angle: Drill entrance and exit angles shall be as shown on the Drawings unless otherwise approved by the ENGINEER.
- 4. Pilot Hole: A smoothly curved pilot hole shall follow the designated centerline of the pipe profiles as shown on the Drawings. The directional tolerance of the holes will be as follows:
  - a. Vertical tolerances As shown on the profile in the Drawings. The elevation of the pipe shall be no deeper than 5 feet shown, nor shallower than 1 foot shown.
  - b. Horizontal tolerances –The pilot hole drill shall be within 2 feet of what is shown in the Contract Drawings. If the horizontal drill is being installed in a designated utility easement, the final drilled pipe shall under no circumstances extend outside of the easement limits.
  - c. Curve radius The overall radius of curvature over a series of pipe segments should average what is shown on the plans. Specific locations will be checked using the 3 point Curve Radius method described below:
    - 3 point Curve Radius: The installed/drilled pilot hole radius of curvature shall not be tighter than 80% of the minimum radius of curvature as shown on the drawings (example, radius of curvature shown on plans = 2,000 feet. 80% is 1,600 feet) as calculated by the 3 joint method described below. The drilled radius of curvature shall be calculated over any and all three joint (2 drill pipe rods) segment using the following formula:  $R_{drilled} = (L_{drilled}/A_{avg}) * 57.30$

Where: R<sub>drilled</sub>, (feet) is the calculated/estimated drilled radius

## HORIZONTAL DIRECTIONAL DRILLING

L<sub>drilled,</sub> (feet) is the segment length (2 drill pipe rods)

A<sub>Avg</sub> is the difference in degrees (delta) of either the inclination or azimuth angle in degrees of the joint at the beginning of the 2 drill rod section and the end of the two drill rod section

In the case of horizontal curves the azimuth angles will be used and the inclination angles will be used everywhere else for A<sub>Avg</sub>

- d. Entry point location The pilot hole shall enter the ground as shown on the Drawings.
- e. Accuracy of Exit Point/Drill Target The exit point shall fall within a rectangle of 4 feet wide and 8 feet long centered on the planned exit point. The CONTRACTOR shall plug back with cement and re-drill any portion of the hole as necessary to meet these criteria at the CONTRACTOR's cost.
- 5. Drill Size: The size and characteristics of the horizontal directional drill and supporting equipment is the CONTRACTOR's choice.
- 6. Instrumentation: CONTRACTOR shall at all times provide and maintain instrumentation which will accurately locate the pilot hole, measure drill string axial and torsional loads, and measure drilling fluid discharge rate and pressure. ENGINEER will have access to these instruments, readings, and written output at all times.
  - a. The position of the drill string shall be monitored by CONTRACTOR with measurement-while-drilling (MWD) instruments. CONTRACTOR. Deviations between the recorded position of the drill string and the specified position of the drill string shall be documented and immediately brought to the attention of the ENGINEER.
  - b. The CONTRACTOR shall also provide sufficient spares or replacement items of the above equipment to maintain directional capacity at all times.
  - c. The placement of the HDD survey guidance system shall be placed within the limits of construction (LOC), if used.
- 7. Reaming Operations: Reaming shall be completed by the CONTRACTOR in accordance with the CONTRACTOR submitted work plan. CONTRACTOR shall supply to ENGINEER an estimate of drilling fluids to be utilized for each reaming cycle.

## C. PIPELINE ASSEMBLY AND INSTALLATION

- The CONTRACTOR shall assemble and install the pipe and fittings in strict conformance with the pipe/fitting manufacturer's instructions. Pipe shall be fused only by a certified fusion technician. A copy of the assembly instructions shall be on hand at all times during assembly for the CONTRACTOR to follow and for the OWNER to check that proper procedures are being followed.
- 2. Maximum allowable tensile force imposed on the pull section shall be less than or equal to 80% of the pipe manufacturer's safety pull (or tensile) strength.
- 3. All temporary work storage sites available to the CONTRACTOR are located as shown in the Drawings. CONTRACTOR shall provide skids and padding to protect the pipe from abrasion and prevent pipes from contacting the ground.
- 4. CONTRACTOR shall provide supports and rollers along the lay down space to support the product during the installation. The roller supports shall have plywood placed below them to minimize damage to the underlying grass.

- 5. Air Pretest: Conduct an air test of the assembled pipeline before pull back at 30 psi with no measurable drop in pressure for 2 hours. CONTRACTOR shall provide the compressor, fittings, hoses, and test gauge for the test. Pressure and temperature shall be monitored and recorded with certified instruments during the test.
- 6. During the pipeline installation and pullback operation, the CONTRACTOR shall monitor pipe roller system and use of sideboom equipment to minimize stresses on the pipe. CONTRACTOR shall cease installation operations if damage to the pipe occurs. Damage to the pipe shall be repaired before resuming pulling operations.
- 7. Buoyancy Control: The pipeline must be filled with water (ballasting) as installation proceeds, to prevent buckling and reduce buoyancy. For reclaimed water conveyance pipes, reclaimed water may be used for buoyancy control.
- 8. Electrofusion couplings: Prepare the pipe surfaces that are to be fused to the coupling according the manufacturer's instructions. Use tools designed for the process. Pipe and couplings shall be conditioned prior to joining at the minimum or maximum pipe temperature allowable for fusion. Do not cover the fused joint until after the pressure testing described in Section 510.
- 9. Transition to PVC: Each pipeline installed via HDD method shall include two (2) transitions from HDPE to PVC. One transition shall be on either end of the HDPE pipe to facilitate the open-cut portions of the project in PVC.

## 3.06 SITE RESTORATION AND DEMOBILIZATION

- A. CONTRACTOR shall remove all equipment, material, drilling mud and waste from the site.
- B. The CONTRACTOR shall grade the areas around the entrance and exits, including the pipe laydown area, back to their original contours after the pipeline is installed. CONTRACTOR may use approved imported fill forre-grading.
- C. CONTRACTOR shall restore all paved surfaces and graveled subgrades and surfaces removed or disturbed during construction.

# PART 4 MEASUREMENT AND PAYMENT

## 4.01 MEASUREMENT

A. Installation of HDPE via HDD shall be measured on a lump sum basis for each crossing, including all labor, materials, equipment, and HDPE to PVC transitions necessary to install the following:

US290 20-inch diameter DR9 HDPE pipeline

Springdale 12-inch diameter DR9 HDPE pipeline

Springdale 20-inch diameter DR9 HDPE pipeline

#### 4.02 PAYMENT

A. Payment of the installation of HDPE pipe via HDD will be based upon the lump sum price bid for each of the potable water line from the entry location shown on the Drawings to the exit location shown on the Drawings. The price shall include full compensation for labor, materials, and equipment to furnish, prepare, haul, install, and test required the HDPE Pipe, and incidentals necessary to complete the work, including excavation, backfilling, and disposal of surplus materials.

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# HORIZONTAL DIRECTIONAL DRILLING

- B. Payment for installation of HDPE pipe shall be paid in accordance with the following performance schedule:
  - 1. Pilot Hole 30%
  - 2. Reaming 20%
  - 3. Pullback 20%
  - 4. Testing 15%
  - 5. Transition to PVC 5%
  - 6. Restoration 10%
- C. Payments will be made under the following:

Pay Item No.	Item Description	Unit
SS2450-A:	Horizontal Directional Drilling and Installation of 20-inch Dia. HDPE Pipe at US 290 Frontage Road	Per Lump Sum
SS2450-B:	Horizontal Directional Drilling and Installation of 12-inch Dia. HDPE Pipe at Springdale Road	Per Lump Sum
SS2450-C:	Horizontal Directional Drilling and Installation of 20-inch Dia. HDPE Pipe at Springdale Road	Per Lump Sum

## **END**



# PART I - GENERAL

#### 1.1 SUMMARY

- A. The work includes, but is not limited to, the following principal systems and equipment:
  - 1. 120/208-Volt System
  - 2. 480-Volt System
  - 3. Motors
  - 4. Motor Control Centers
  - 5. Panel boards
  - 6. Conduit and Raceways
  - 7. Transformers
  - 8. Lighting fixtures and lamps
  - 9. Grounding and Lightning Protection
  - 10. Conductors
  - 11. Miscellaneous Controls and Equipment
  - 12. Cathodic Protection Systems

# 1.2 RELATED REQUIREMENTS

A. Work as called for on PLANS, or in this or other Specification Sections.

#### B. Intent:

- 1. The intent of the contract drawings or PLANS is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system.
- 2. Electrical drawings are generally diagrammatic and show approximate location and extent of work.
- 3. Install the work complete, including minor details necessary to perform the function indicated.
- 4. In case of doubt as to work intended, or if amplification or clarification is needed, request instructions from the ENGINEER in the form of Request for Information (RFI).
- 5. It is also the intent of these Contract Documents for the Electrical and Package System Contractor, if applicable, to coordinate with each other in order to provide a complete and workable system with all wiring, conduit and accessories required which may not be shown on the PLANS.

## C. Discrepancies:

- 1. Review pertinent drawings and adjust the work to conditions shown.
- 2. Where discrepancies occur between PLANS, specifications, and actual

field conditions, immediately notify the ENGINEER in writing for interpretation.

3. Dimensions on electrical drawings shall be coordinated with other discipline drawings.

## D. Outlet and Equipment Locations:

- 1. Coordinate the actual locations of electrical outlets and equipment with building features and mechanical equipment as indicated on other discipline drawings.
- 2. Review with the OWNER and ENGINEER any proposed changes in outlet or equipment location.
- 3. Relocation of outlets before installation, up to 10 feet from the position indicated, may be directed by OWNER and ENGINEER without additional cost.
- 4. Remove and relocate outlets placed in an unsuitable location, when so requested by the OWNER and ENGINEER.

#### 1.3 REFERENCES

- A. Perform work, furnish and install materials and equipment in full accordance with the latest issue of applicable rules, regulations, requirements, and specifications of the following:
  - 1. Austin Water (AW) Facility Engineering Standards and Specifications
  - 2. Local laws and ordinances
  - 3. State and Federal Laws
  - 4. National Electrical Code (NEC)
  - 5. State Fire Marshal
  - 6. Underwriters' Laboratories (UL)
  - 7. National Electrical Safety Code (NESC)
  - 8. American National Standards Institute (ANSI)
  - 9. National Electrical Manufacturer's Association (NEMA)
  - 10.National Electrical Contractor's Association (NECA) Standard of Installation
  - 11.NFPA 70E Standard for Electrical Safety in the Workplace
  - 12. Institute of Electrical and Electronics Engineers (IEEE)
  - 13.Insulated Cable Engineers Association (ICEA)
  - 14. Occupational Safety and Health Act (OSHA)
  - 15.International Electrical Testing Association (NETA)
  - 16. American Society for Testing and Materials (ASTM)
  - 17. National Fire Protection Association (NFPA)
  - 18. American Concrete Institute (ACI)
  - 19. International Building Code (IBC)

- 20. Insulated Power Cable Engineers Association (IPCEA)
- 21. Association Edison Illuminating Company (AEIC)
- B. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory.

# C. Product Quality:

 All electrical items shall be new and unused. Items such as cables, transformers, motors, control centers, etc., shall be newly manufactured for this project. Proof of purchase documents shall be provided upon request. Utilize products of a single manufacturer for each item.

# D. Discrepancies:

- 1. The PLANS and Specifications are intended to comply with listed codes, ordinances, regulations and standards.
- 2. Where discrepancies occur, immediately notify the ENGINEER in writing and ask for an interpretation.
- 3. Should installed materials or workmanship fail to comply, the CONTRACTOR is responsible for correcting the improper installation at no cost to the OWNER.
- 4. Additionally, where sizes, capacities, or other such features are required in excess of minimum code or standards requirement, provide those specified or shown.

## E. Permits:

 Obtain certificates of inspection and other permits required as a part of the work at no cost to the OWNER.

#### 1.4 DEFINITIONS

A. For the purposes of this specification, the word CONTRACTOR specified herein shall pertain to the Electrical and/or Instrumentation and Control (I&C) Contractor, unless indicated otherwise in this document.

#### 1.5 SYSTEM DESCRIPTION

- A. The CONTRACTOR shall be responsible for:
  - 1. Complete systems in accordance with the intent of these Contract Documents.
  - 2. Coordinating the details of facility equipment and construction for all Specification Divisions which affect the work covered under DIVISION 16.
  - 3. Furnishing and installing incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.

## 4. Coordination of Work

- a. It's the responsibility of the General/Prime Contractor to maintain coordination between all trades performing electrical and I&C work.
- B. Electrical plan drawings show only general locations of equipment, devices, and raceway, unless otherwise noted. The Electrical Contractor shall be responsible for the proper routing of raceway, subject to the approval of the ENGINEER.
- C. Submit to the ENGINEER in writing details of any necessary, proposed departures from these Contract Documents, and the reasons therefore. Submit such request as soon as practicable, but no later than ten (10) days after Notice to Proceed (NTP). Make no such departures without written approval of the ENGINEER.
- D. Where the CONTRACTOR is submitting a packaged system, CONTRACTOR shall meet the requirements of DIVISION 16 and DIVISION 17. This includes field cables, conductors, labeling, relays, terminal blocks, conduits, junction boxes, circuit breakers, combination starters, pushbuttons, pilot lights, motors, etc. Deviations shall not be accepted, unless approved in writing in advance. Control centers and special control cabinets wired to terminal blocks shall include the manufacturer's standard quality, unless specifically mentioned to the contrary on the drawings or in the specifications.
  - E. Maintain continuity of electric service to functioning portions of the process or buildings during hours they are normally in use. Temporary outages will be permitted during cutover work at such times and places as can be prearranged with the OWNER'S designated Representative. Give the OWNER a minimum of 14 days notice prior to any shutdowns. Such outages shall be kept to a minimum number and minimum length of time. Make no outages without prior written authorization of the ENGINEER. Include costs for temporary wiring and overtime work required in the Contract price. Remove temporary wiring at the completion of the work. The CONTRACTOR shall be responsible to provide and pay for temporary power to any facility during construction to facilitate the new construction unless prior authorization is approved for use of site power by the OWNER. If a generator is needed, the CONTRACTOR shall be responsible for all associated costs, including fuel.
- F. Unless shown in detail, the drawings are diagrammatic and do not necessarily give exact details as to elevations and routing of raceways, nor do they show all offsets and fittings; nevertheless, install the raceway system to conform to the structural and mechanical conditions of the construction.
- G. Cabling inside equipment shall be carefully routed, trained, and laced. Placing cables so that they obstruct equipment devices is not acceptable.

# 1.6 SUBMITTALS

A. Data Required:

- 1. Submit shop drawings, product data and all other required information as specified in DIVISION 1. Submittals are required on all products and items to be installed on this project.
- 2. Submittal data must show the manufacturer's name, published ratings or capacity data, detailed equipment drawing for fabricated items, panel diagrams, wiring diagrams, installation instructions and other pertinent data.
- 3. Where literature is submitted covering a group or series of similar items, the applicable items must be clearly indicated. Mark through items not being provided and clearly identify all options being provided.
- 4. Do not combine submittals for multiple Specifications Sections.

#### B. Submittal Items:

1. Submittals are required for all equipment and materials to be used on this project. Submittals shall be complete with all pertinent information and installation details. The CONTRACTOR shall assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals. No installation shall begin until the shop drawings and/or submittals have been approved. In case of correction or rejection, resubmit until such time as they are accepted by the OWNER'S REPRESENTATIVE, and such procedures will not be cause for delay.

## C. Terminal Connection Diagrams:

- Submit terminal connection diagrams for approval prior to any wire installation.
- 2. Submit finalized terminal connection diagrams at the end of the Contract.

## 1.7 QUALITY ASSURANCE

- A. All manufacturers named in the contract specifications are a basis as a standard of quality. Substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the ENGINEER and OWNER.
- B. An acceptable CONTRACTOR for the work under DIVISION 16, DIVISION 17 and other applicable specifications must have personnel with experience, training, and skill to provide a practical working system. The CONTRACTOR shall have previous water and wastewater experience with at least 5 years in business.
  - 1. The CONTRACTOR shall be required to furnish acceptable evidence of having installed not less than three systems of size and type comparable to this project.
  - 2. The systems must have served satisfactorily for not less than 3 years.

- 3. The superintendent must have had experience in installing not less than three systems.
- 4. The CONTRACTOR shall submit qualifications of his firm and resumes of his personnel who will work on this project.
- C. All electrical work shall be performed by workers skilled in the electrical trade and licensed for the work by the local authority (Licensed by the State of Texas).
- D. A licensed Master Electrician or a licensed Journeyman Electrician holding a current license in the State of Texas shall be required to be on the job site during the performance of any electrical work.
- E. All cable splicing and termination methods and materials shall be of the type recommended by the splicing materials manufacturer for the cable to be spliced, and shall be approved by the ENGINEER prior to installation.
- F. All materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, the best practices of the trade, and in conformance with the Contract Documents. The CONTRACTOR shall promptly notify the ENGINEER in writing of any conflict between any requirements of the Contract Documents and manufacturer's directions, and shall obtain written instructions from the ENGINEER before proceeding with the work. Should the CONTRACTOR perform any work that does not comply with the manufacturer's directions or such written instructions from the ENGINEER, the CONTRACTOR shall bear all costs arising in correcting deficiencies.
- G. All equipment and materials shall be new, unless specifically noted otherwise, and shall bear the manufacturer's name, trademark, ASME, UL, NEMA and/or other labels in every case where a standard has been established for the particular item. Equipment shall be the latest approved design of a standard product of a manufacturer regularly engaged in the production of the required type of equipment.
- H. It is the responsibility of the CONTRACTOR to ensure that items furnished fit the space available with adequate room for proper operation and maintenance. The CONTRACTOR shall make measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that, in the final inspection, will suit the true intent and meaning of the PLANS, Specifications and Contract Documents.
- I. The CONTRACTOR shall furnish and install all equipment, accessories, connections and incidental items necessary to complete the work, ready for use and operation by the OWNER.
- J. When the ENGINEER and OWNER have reviewed equipment submittals and given instructions to proceed with the installation of items of equipment that require arrangements or connections different from those shown on the drawings, it shall be the responsibility of the CONTRACTOR to install the equipment to operate properly and in accordance with the intent of the

PLANS and Specifications, and he shall provide any additional equipment and materials that may be required. All changes shall be made at no increase in the Contract amount.

K. The CONTRACTOR shall support the installation of all equipment, plumb, rigid and true to line. The CONTRACTOR shall determine how equipment, fixtures, conduit, etc., are to be installed, and shall provide foundations, bolts, inserts, stands, hangers, brackets and accessories for proper support whether or not shown on the drawings.

#### 1.8 DELIVERY STORAGE AND HANDLING

- A. It is the CONTRACTOR'S responsibility to ensure that the equipment is not damaged. If equipment is damaged upon arrival, it shall be returned to the equipment manufacturer or supplier.
- The CONTRACTOR shall have a representative on site to receive any and all deliveries.
- C. Refer to section 3.9 of this document.

# 1.9 - 1.11 (NOT USED)

## **PART II - PRODUCTS**

#### 2.1 ACCEPTABLE MANUFACTURERS

# 2.2 MATERIALS/CONSTRUCTION

- A. Condition: Materials and equipment provided under these Specifications must be new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer's latest standard design for the type of equipment specified.
- B. NEC and UL: Products must conform to requirements of the National Electrical Code. Where Underwriters' Laboratories have set standards, listed products, and issued labels, products used must be listed and labeled by UL.
- C. NEMA and IEC: Only NEMA rated equipment is acceptable. IEC or dual rated NEMA/IEC equipment are not acceptable.
- D. Factory Finish: Equipment must be delivered with a hard surface, factory-applied finish so that no additional field painting is required.
- E. Field Installation: All field installed equipment, conduit, etc., shall require Type 316 stainless steel nuts, bolts, washers, metal framing and supports, and other items as indicated on the PLANS and Specifications.
- F. Seismic Design: All electrical equipment to be designed in accordance with/IBC-2006 & ASCE 7-05 code for Seismic Design.

# 2.3 - 2.4 (NOT USED)

## **PART III - EXECUTION**

#### 3.1 GENERAL

# A. Preparation:

- 1. At the job site, it the CONTRACTOR'S responsibility to maintain a full-size set of as built drawings that are updated daily.
  - a. On the prints, record field changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings.
  - b. Mark the drawings with a colored pencil. Record installed feeder conduits, dimensioning the exact location and elevation of the conduit.
- 2. At the job site, maintain a set of equipment terminal connection diagrams.

## B. Delivery:

1. Deliver as built red line drawings to the ENGINEER in the number and manner specified in DIVISION 1.

## **3.2** (NOT USED)

# 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Cooperation with Other Trades:
  - 1. Coordinate equipment layout in sufficient time to be coordinated with work of others, provide drawings and layout work showing exact size and location of sleeves, openings or inserts for electrical equipment in slabs, walls, partitions and chases.

#### B. Workmanship:

1. Work must be performed by workers skilled in their trade. The installation must be complete whether the work is concealed or exposed as defined by the NEC.

## C. Concrete Electrical Equipment Pads:

## 1. Thickness:

- a. Indoor: 4-inch-thick concrete housekeeping pads with chamfered edges or as indicated on the drawings.
- b. Outdoor: 6-inch-thick concrete housekeeping pads with chamfered edges or as indicated on the drawings.
- 2. Place pads on roughened floor slabs, sized so that outer edges extend a minimum of 3 inches beyond indoor equipment.

- 3. Exterior pads shall extend one foot beyond the equipment, including cooling fins.
- 4. Trowel pads smooth and chamfer edges to a 1-inch bevel.
- 5. Provide dowels in slab, and rebar between the dowels or as designed by the ENGINEER.
- 6. Housekeeping pads shall be level.
- 7. Secure equipment to pads as recommended by the manufacturer.
- 8. Follow structural detail where applicable.

## D. Setting of Equipment:

- 1. Equipment must be leveled and set plumb.
- 2. All surface mounted Electrical and I&C equipment shall be spaced a minimum 1/4-inch from the mounting surface.
- 3. Stainless Steel 316 bolts, nuts and washers shall be used to anchor the equipment.

# E. Sealing of Equipment:

- 1. Permanently seal outdoor equipment at the base using concrete grout.
- 2. Seal or screen openings into equipment to prevent entrance of animals, birds and insects.
- 3. Use stainless steel mesh with openings not larger than 1/16-inch squares for screened openings.
- 4. Seal small cracks and openings from the inside with silicone sealing compound.
- 5. As a minimum, seal all conduits entering a panel with duct seal unless otherwise directed by the ENGINEER or PLANS.
- F. Concealed Work: Conceal electrical work in walls, floors, chases, under floors, underground and above ceilings except:
  - 1. Where shown or specified to be exposed. Exposed is understood to mean open to view.
  - 2. Where exposure is necessary to the proper function.
  - 3. Where size of materials and equipment precludes concealment.

## G. Cutting and Patching:

1. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of the ENGINEER.

Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces neatly to original condition.

2. If a CONTRACTOR damages concealed conduits, it is the CONTRACTOR'S responsibility to make all necessary repairs at no cost to the OWNER.

## H. Load Balance:

1. The Drawings and Specifications indicate circuiting to electrical loads and distribution equipment. Balance electrical load between phases as closely as possible on switchboards, panel boards, motor control centers, etc.

#### I. Motor Rotation:

1. Coordinate rotation checks with the ENGINEER and the CONTRACTOR responsible for the driven equipment. Submit a written report to the ENGINEER for each motor verifying that rotation has been checked and corrected.

#### 3.4 REPAIR/RESTORATION

A. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. If extensive damage is done to equipment paint surfaces, refinish the entire equipment in a manner that provides finish equal to or better than the factory finish, and that meets the requirements of the Specifications and is acceptable to the ENGINEER.

#### 3.5 -3.6(NOT USED)

#### 3.7 **CLEANING**

- A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.
- B. All temporary wiring, wiring devices and associated equipment shall be removed upon completion of the project.

#### 3.8 **TESTING AND INSPECTION**

## A. Test Conditions:

1. Place circuits and equipment into service under normal conditions, collectively and separately, as may be necessary to determine satisfactory operation.

- 2. Perform specified tests in the presence of the ENGINEER, as specified in DIVISION 1 and DIVISION 16.
- 3. Furnish all instruments, wiring, equipment, and personnel required for conducting tests. Engage the services of an independent contractor if required. Test equipment shall be calibrated within the last 6 months.
- 4. Demonstrate that the equipment operates in accordance with requirements of the plans and specifications.
- 5. No process equipment is to be operated until any associated HVAC equipment and auxiliary equipment is operational.

## 3.9 STORAGE, HANDLING AND PROTECTION

#### A. Moisture:

- 1. During construction, provide heaters to protect switchgear, transformers, motors, control equipment, and other items from moisture absorption and corrosion.
- 2. Apply protection immediately on receiving the products and provide continuous protection.
- 3. Store all equipment indoors in dry, well ventilated and heated space or as indicated by the ENGINEER/Manufacturer.

## B. Clean:

1. Keep products clean by elevating above ground or floor and by using suitable coverings.

## C. Damage:

1. Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.

#### D. Finish:

1. Protect factory finish from damage during construction operations and until final acceptance of the project.

## 3.10 - 3.11 (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

## **PART I - GENERAL**

#### 1.1 SUMMARY

A. Furnish and install tags/nameplate on all equipment, devices, instruments, J-boxes, Panel boards and conductors marking as indicated on the drawings and specified herein. Major equipment, other than conduit system, shall be furnished with nameplates in accordance with their individual specifications.

# 1.2 RELATED REQUIREMENTS

- A. Work as called for on PLANS, or in this or other Specification Sections.
- **1.3 1.11** (NOT USED)

#### **PART II - PRODUCTS**

# **2.1 ACCEPTABLE MANUFACTURERS** (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. WIRE MARKERS
  - 1. Wire markers shall be as specified in Section 16205 "Wire and Cable Tagging"

#### **B. NAMEPLATES**

- 1. Nameplates:
  - a. Externally mark electrical equipment by means of suitable nameplates identifying each and the equipment served.
  - b. Provide each piece of equipment with a white phenolic nameplate with 3/16-inch high black lettering secured to front of equipment.
  - c. Supply blank nameplates for spare units and used spaces.
  - d. Actual nameplate legend, which may consist of up to three lines, will be provided to the Engineer on submittals.
- 2. Nameplate Fasteners: Fasten nameplates to equipment only by means of appropriate 316 SS screws.
  - a. Stick-on or adhesives are not allowed on the outside of a panel.
  - b. Machine printed stick-on labels are allowed inside of and/or on the backplane of a panel.
- 3. Nameplate Information: In general, the following information is to be provided for the types of electrical equipment as listed.

- a. Switchgear, Motor Control Centers and Distribution Panel boards: On the mains, identify the piece of equipment, the source, and voltage characteristics, i.e., 480V, 3PH, 3W, etc. For each branch circuit protective device, identify the load served and the primary side circuit number.
- b. Transformers: Identify the service source, load served and transformer designation.
- c. Panel boards: Identify the service source, Panel board designation and voltage characteristics.

## 4. Panel boards:

- a. Prepare a neatly typed circuit directory behind clear heat-resistant plastic for each panel board.
- b. Identify circuits by equipment served and by room numbers, where room numbers exist.
- c. Use equipment names and room numbers selected by the Engineer; names and numbers may be different from those shown on plans.
- d. Indicate spares and spaces with light, erasable pencil markings.
- e. Provide a final set of the panel schedule in the O&M manuals.
- f. Provide a CD with the file for each Panel board to the Owner with the O&M manual.

## 5. Boxes, Small Equipment:

- a. Pull boxes, J-boxes and similar items shall be marked with Nameplates.
- 6. Wall Switches: Engrave the switch plate of the switch with the function of the switch.

## C. POWER OUTLETS, SWITCHES, AND PILOT DEVICES

- 1. Mark power outlets with voltage, phase, panel name, and circuit number.
- 2. Identify all wall switches, disconnect switches, etc. with nametags, circuits served, and panel origin, list to be approved by Engineer/Owner.
- 3. Identify all push-button stations with their functions and equipment served.

# **2.3 - 2.4** (NOT USED)

# **PART III - EXECUTION**

**3.1 - 3.2** (NOT USED)

# 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Furnish and install nameplates for all Panel boards, motor starters, motor control center cubicles, disconnect switches, instrument panels, dry type transformers and control stations.
- B. Engrave the equipment designation, (e.g., "Starter Pump P1"), on nameplates in 3/16-inch black letters on white background of laminated phenolic unless specified otherwise in the equipment section. All switches, indicating lights, pushbuttons, meters and parameter indicators on panels shall be clearly identified with its function or tag, as required. Identification list to be approved by plant personnel through the Engineer.
- C. Stainless Steel tags shall be used on instrument, motors and other devices, as applicable. The tags shall be affixed to the instrument with drive pins or stainless steel chain in such a manner that it does not need to be removed to install the instrument. Motors shall carry the tag assigned to its driven equipment.
- **3.4 3.11** (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

# **PART I - GENERAL**

## 1.1 SUMMARY

A. Furnish and install all cabinets, junction boxes, pull boxes and outlet boxes as shown on the drawings, required by the specifications or NEC, or as otherwise necessary for a satisfactory operating system.

# 1.2 RELATED REQUIREMENTS

A. Work as called for on PLANS, or in this or other Specification Sections.

## 1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced and shall apply as if written here in their entirety. The publications are referred to in the text by basic designation only.
  - 1. NFPA 70 National Electrical Code (NEC)
  - 2. ANSI 514 Electrical Outlet Boxes and fittings
  - 3. ANSI OS 1 Cast Aluminum Outlet Boxes, Device Boxes, Covers and Box Supports, and Steel Covers.

## **1.4 - 1.5** (NOT USED)

## 1.6 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300.
- B. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.
- C. Operations and Maintenance (O&M) Manuals shall be made in accordance with the requirements of Section 01730.

## **1.7 - 1.11** (NOT USED)

## **PART II - PRODUCTS**

**2.1** (NOT USED)

# 2.2 MATERIALS/CONSTRUCTION

A. JUNCTION AND PULL BOXES

- 1. Junction box shall be NEMA 4X constructed of 316 stainless steel. Junction boxes 12" X 12" X 6" and smaller, may be manufactured of aluminum. All splices to be connected to terminal blocks inside junction box. Covers shall be hinged and latches shall be a quarter turn screw. Box to be a Hoffman Concept Series, Rittal Corporation, Saginaw or equal.
- 2. Junction boxes mounted flush in the wall are to be galvanized metal boxes rated for exposure to material it comes in contact with.
- 3. Provide boxes conforming to NEC Article 314.
- 4. Listing: UL 514.

## B. RECEPTACLES AND LIGHT SWITCH BOXES

- All outlet and switch boxes installed outdoor and indoor to be of one piece. All boxes to be provided with covers of the same manufacture as the boxes. The type of cover selected must meet the conditions imposed in every case or as indicated by Engineer. Outdoor receptacle covers shall be While-In-Use Covers per NEC.
- 2. Boxes shall be sand-cast aluminum, 100% copper-free. Boxes to be manufactured by Crouse-Hinds, Appleton, or approved equal, type FS-SA and FD-SA, with above options and accessories.
- 3. Masonry boxes
  - a. Provide stamp metal masonry boxes,
  - b. Use boxes with 1-gang capacity in excess of the number of devices to be installed,
  - c. Extension ring covers shall not be acceptable.
- 4. Listing: UL 514.

## C. TERMINATION CABINETS & BOXES

- Termination cabinets shall be NEMA 4X 316 stainless steel gasketed. Cabinets shall be of sufficient size to adequately contain all terminals, wire-duct, and cables as determined by the CONTRACTOR. Cabinets shall have removable doors (lift-off) not more than 30-inches wide, and shall be equipped with a three point locking latch handle.
- 2. Wire terminal blocks shall be Square D Type M Barrier Block system, or equal.
  - a. M4/6G or B 22014 AWG 6 MM (.234 inch) wide, Grey, Blue, Single Level, 600 volt, 25 amp.
  - b. M6-8G or B 22-8AWG 8MM (.315 inch) wide, Grey Blue, Single Level, 600 volt, 55 amp.

- 3. The wire terminal block system shall be for DIN rail mounting, and shall include fuse/switch blocks, circuit breaker block, and isolation switches.
- D. Acceptable Manufacturers:
  - 1. Hoffman, or approved equal.
- **2.3 -2.4** (NOT USED)

## PART III - EXECUTION

**3.1 GENERAL** (NOT USED)

#### 3.2 PREPARATION

A. Coordinate location of all boxes with all other work.

# 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Junction and Pull boxes:
  - 1. Set junction and pull boxes square and true with building surfaces. Secure boxes firmly to 316 Stainless Steel strut support channels.
  - 2. Install boxes as required to facilitate cable installation in raceway systems.
  - 3. Generally provide boxes in conduit runs of more than 100 feet.
  - 4. Locate boxes strategically and make them of such shape and size to permit easy pulling of wire or cables. Size boxes in accordance to NEC Article 314.28 requirements.

## B. Outlet Boxes

- 1. Flush Boxes:
  - a. Unless otherwise indicated, mount all outlet boxes flush within 1/4-inch of the finished wall or ceiling line
  - b. Securely fasten outlet boxes in position using clips or other suitable means.
- 2. Mounting Height:
  - a. Mounting height of a wall-mounted outlet box means the height from finished floor to horizontal center line of the cover plate.
    - 1) Switches shall be mounted at 50-inches
    - 2) Receptacles shall be mounted at 36-inches

- 3) Remove and relocate any outlet box placed in an unsuitable location.
- b. Where outlets are indicated adjacent to each other, mount these outlets in a symmetrical pattern with all tops at the same elevation.
- c. Where outlets are indicated adjacent, but with different mounting heights, line up outlets to form a symmetrical vertical pattern on the wall.
- d. Verify the final location of each outlet with Engineer before roughin.

# 3. Box Openings:

a. Provide only the conduit openings necessary to accommodate the conduits at the individual location.

# **3.4 - 3.11** (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

## **PART I - GENERAL**

#### 1.1 SUMMARY

A. Furnish and install all necessary wiring devices at the locations indicated on the Plans and elsewhere as required.

## 1.2 RELATED REQUIREMENTS

- A. Work as called for on PLANS, or in this or other Specification Sections.
- **1.3 1.5** (NOT USED)

#### 1.6 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300, "Submittals".
- B. Operations and Maintenance (O&M) Manuals shall be made in accordance with the requirements of Section 01730.
- **1.7 1.11** (NOT USED)

# **PART II - PRODUCTS**

# 2.1 ACCEPTABLE MANUFACTURERS (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. LIGHT SWITCHES
  - Specification grade, 20 amp, 120/277 volts. Hubbell 1221-I through 1224-I (single pole through four-way respectively). Ivory operating handle: Equals by Bryant, General Electric, Pass and Seymour are acceptable.
  - 2. Switch cover plates shall be Die Cast Aluminum, 99% copper-free, "Crouse Hinds" DS185, or approved equal, or as indicated on the Plans.
  - 3. Mount in boxes as specified in Section 16130.
  - 4. All mounting hardware is to be 316 stainless steel.

## **B. RECEPTACLES**

- 1. Standard:
  - a. Hubbell No. 5362-I, or approved equal by Bryant, General Electric, Pass and Seymour. Duplex, 3-wire, polarized grounding type, rated 20 amp, 125 volt, 60 Hertz.
- 2. Ground Fault:

- a. Weather resistant, Hubbell No. GFTR20IU, or approved equal by Bryant, General Electric, Pass and Seymour.
- 3. Mount in boxes as specified in Section 16130.

## C. RECEPTACLE COVERS

- 1. Outdoor receptacle covers shall be While-In-Use covers per NEC.
- 2. Indoor receptacle cover plates shall be Die Cast Aluminum, 99% copper-free, manufactured by "Crouse-Hinds" WLRS (single cover) and WLRD (duplex cover), or approved equal.
- **2.3 2.4** (NOT USED)

# **PART III - EXECUTION**

- 3.1 GENERAL
- 3.2 PREPARATION
- 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS
  - A. INSTALLATION
    - 1. Switch and receptacle elevations shall be as indicated in Section 16130.
    - 2. Indoor and outdoor boxes shall be grounded per Section 16550 Grounding.
- **3.4 3.11** (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

## **PART I - GENERAL**

#### 1.1 SUMMARY

This section specifies raceways, fittings, and supports for all cables, conductors and electrical equipment. The CONTRACTOR shall furnish and install complete raceway systems in accordance with the following specifications.

#### 1.2 RELATED REQUIREMENTS

A. Work as called for on PLANS, or in this or other Specification Sections.

#### 1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced and shall apply as if written here in their entirety. The publications are referred to in the text by basic designation only.
  - 1. ANSI C80.1 Electric Rigid Steel Conduit
  - 2. ANSI C80.5 Electrical Rigid Aluminum Conduit
  - ETL-PVC-001 Edison Testing Lab Polyvinyl Chloride
  - 4. NEMA 250 Enclosures for Electrical Equipment (1,000 Volts Maximum)
  - 5. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Tubing and Conduit
  - 6. NEMA TC 3 Polyvinyl Chloride (PVC) Fittingsfor Use with Rigid PVC Conduit and Tubing
  - 7. NEMA TC 14 Standard for Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
  - 8. NFPA 70 National Electrical Code (NEC)
  - 9. UL 651 Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
  - 10. UL 2515 AG Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
  - 11. UL 2420 BG Belowground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
  - 12. UL7 514B Conduit, Tubing, and Cable Fittings

# 1.4 - 1.5 (NOT USED)

# 1.6 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of Section 01300.

## 1.7 - 1.10 (NOT USED)

#### 1.11 OPERATION AND MAINTENANCE MANUALS

A. Operations and Maintenance (O&M) Manuals are not required for materials covered under this Section.

# **PART II - PRODUCTS**

# 2.1 (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. Exposed-Outdoor and Non-Chemical Areas Above Ground Level
  - 1. Rigid Aluminum Metal Conduit System
    - a. Conduit run above ground shall be U.L. listed 99% copper free rigid aluminum and

# RACEWAYS, FITTINGS, AND SUPPORTS SECTION 16150

meet the requirements of ANSI C80.5. Conduit pipe straps and hardware to be 316 stainless steel. Conduit shall be manufactured by Allied Company, or approved equal.

b. Minimum above grade conduit size for all work shall be 3/4-inch.

#### 2. Conduit Seals

- a. Conduit seals to be suitable for use in class-I, group B, C, and D, and class-II group F and G. Conduit seals shall also meet or exceed the following minimum requirements:
- b. Seal body, nipples and closures shall be 99% copper-free aluminum. Seal bodies shall be filled with 3M 2123 Re-Enterable Sealing Compound.
  - 1) Class 1, Division 1 areas shall be sealed per NEC requirements.
- c. Drain: Stainless steel
- d. Removable Nipples: 99% copper-free aluminum
- e. Conduit seals to be manufactured by Crouse-Hinds type EYS drain seals with specified options, or approved equal.
- f. Seals to be installed directly adjacent to, and, just immediately before entering wet well junction box. See details on drawings.

#### Conduit Hubs

a. Conduit hubs shall be the grounding type, 99% copper-free aluminum (body, nipples, etc.), with integral insulated throat, and with solder-less grounding lugs as manufactured by Myers, or approved equal. Conduit hubs shall be furnished complete with rubber gasket.

# 4. Grounding Bushings

 a. Conduit grounding bushing shall be 99% copper-free aluminum (body, nipples, etc.), with integral insulated throat, and with solder-less grounding lugs as manufactured by Meyers type STAG, or approved equal.

#### 5. Conduit Bodies

a. All conduit bodies shall be 99% copper-free aluminum. Conduit bodies shall be manufactured by Crouse-Hinds Form 7, or approved equal.

## 6. Conduit Body Covers

 a. Conduit Body Covers shall be die cast aluminum with 316 stainless steel screws. Snap on covers are unacceptable. Supply separate gaskets with all covers.

# 7. Conduit Unions

a. Conduit unions shall be threaded, 99% copper-free aluminum. Conduit unions shall be manufactured by Crouse-Hinds type UNF or UNY, or approved equal by Appleton or O.Z. Gedney.

# 8. Clamp Backs

a. Single runs of conduit may be supported with cast aluminum clamp backs with stainless steel hardware and standoffs.

#### Conduit Straps

a. All conduit straps shall be 316 Stainless Steel unless indicated differently by the plans and or specifications.

# 10. Liquid Tight Flexible Conduit

- a. Liquid tight flexible conduit shall be non-metallic (NM) type liquid tight flex for sizes ¾" through 2". For sizes 2 ½" and larger provide standard seal tight flex with aluminum core, formed from PVC plastic. Provide aluminum or nonmetallic liquid tight fittings that are suitable for installation in temperature range between -20 degrees C to +60 degrees C (suitable for use outdoors and indoors). Liquid tight flexible conduit and fittings shall be as manufactured by "Electri-Flex" series NM type B-PVC, Thomas & Betts type LT-38P, or approved equal. ½" type NM flexible liquid tight conduit may be used for instruments having ½" threaded entry point.
- b. Liquid tight flexible conduit shall be used for connections to motors, field instruments, etc., and any equipment subject to vibration, and, where shown on the drawings. Maximum length to be 36" unless otherwise noted on drawings or approved by the OWNER or ENGINEER.

## 11. Electrical Equipment and Raceways Support Channels

a. Electrical equipment and raceway support channels shall be fabricated with 316 stainless steel material manufactured by Unistrut Corporation series P-1000SS and P-1001SS, or approved equal. All fastening hardware, fittings, supports, base posts, clamps, framing system, etc. shall also be fabricated with 316 stainless steel. Manufacturer shall be Unistrut Corporation, or approved equal.

#### B. Exposed Chemical Areas

## 1. Schedule 80 PVC

- a. Conduit shall be Schedule 80 PVC, U.L. rated, No. 651, conforming to NEMA standard TC-2 and listed in conformity with Article 352 of the National Electrical Code (NEC). The conduit is to be manufactured by Carlon, or approved equal. Solvent weld shall be a type approved by the conduit manufacturer.
- b. Minimum above grade conduit size for all work shall be 3/4-inch.

## 2. Conduit Hubs

a. Conduit hubs shall be manufactured from fiberglass as manufactured by Champion, or approved equal. Conduit hubs shall be furnished complete with rubber gasket.

#### 3. Conduit Bodies

a. All conduit bodies shall be manufactured from PVC.

## 4. Conduit Body Covers

 Conduit Body Covers shall be PVC with 316 stainless steel screws. Conduit body covers shall be furnished complete with rubber gasket.

# 5. Clamp Backs

a. Single runs of conduit may be supported with PVC or fiberglass clamp backs and standoffs with fiberglass hardware.

## 6. Conduit Straps

 All conduit straps shall be fiberglass or PVC, unless indicated differently by the plans and or specifications.

## 7. Liquid Tight Flexible Conduit

- a. Liquid tight flexible conduit shall be non-metallic (NM) type liquid tight flex for sizes ¾" through 2". For sizes 2 ½" and larger provide standard seal tight flex with aluminum core, formed from PVC plastic. Provide aluminum or nonmetallic liquid tight fittings that are suitable for installation in temperature range between -20 degrees C to +60 degrees C (suitable for use outdoors and indoors). Liquid tight flexible conduit and fittings shall be as manufactured by Electri-Flex series NM type B-PVC, Thomas & Betts type LT-38P, or approved equal. ½" type NM flexible liquid tight conduit may be used for instruments having ½" threaded entry point.
- b. Liquid tight flexible conduit shall be used for connections to motors, field instruments, etc., and any equipment subject to vibration, and, where shown on the drawings. Maximum length to be 36" unless otherwise noted on drawings or approved by the OWNER or ENGINEER.
- 8. Supporting Hardware and Brackets
  - a. All support channels shall be manufactured from fiberglass.
  - b. All fastening hardware shall be suitable for chemical area, or as approved by the ENGINEER/OWNER.
- C. Underground Conduit System in Duct Bank System and Conduit Concealed in Concrete
  - 1. Schedule 40 PVC
    - a. Conduit run underground in duct bank system shall be Schedule 40 PVC, U.L. rated No. 651, conforming to NEMA standard TC-2 and listed in conformity with Article 352 of the National Electrical Code (NEC). The conduit is to be manufactured by Carlon, or approved equal. Solvent weld shall be a type approved by the conduit manufacturer.
    - b. Minimum conduit size for all underground work shall be 1-inch.
  - 2. PVC Coated Galvanized Rigid Steel Conduit
    - a. PVC coated RGS conduit shall be coated with a 40 mil exterior coating of PVC and a 2 mil urethane interior coating. The coating system shall be in compliance with ETL PVC-001. Refer to Part 3- Execution of this Section, and to details provided on the contract drawings. PVC Coated Rigid Galvanized Steel conduit shall be Plasti-Bond REDH2OT or Perma-Cote coated conduit as manufactured by Rob Roy. A manufacturer's installer certification shall be required for electricians installing the PVC coated RGS conduits.
    - b. Minimum conduit size for all underground work shall be 1-inch.
  - 3. Reinforced Thermosetting Resin Conduit (RTRC)
    - a. RTRC shall be Champion HAZ DUCT XW Type fiberglass conduit or equivalent.
    - b. The use of RTRC shall conform to Article 355 of the National Electric Code (NEC).
    - c. Installation of conduit, including field bends, shall be done so ONLY in accordance with the manufacturer's installation instructions.

## d. Fittings

- 1) 90 degree bends with factory installed 2 deep socket PVC coupling and 1 fiberglass coupling bonded to elbow
  - I. For 3/4" 1 ½", use type IPS (NOTE: Minimum conduit size for all underground work shall be 1-inch)
    - i. Example part number for 1": 10C-XW-90-2DF
  - II. For 2" 6", use type ID
    - i. Example part number for 2": 20D-XW-90-2DF
- 2) Sleeve Couplings
  - I. For  $3/4" 1\frac{1}{2}"$ , use type IPS (NOTE: Minimum conduit size for all underground work shall be 1-inch)
    - i. Example part number for 1": 10C-XW-42
  - II. For 2" 6", use type ID
    - i. Example part number for 2": 20D-XW-42
- 3) Female Terminal Adapters
  - I. For  $3/4" 1\frac{1}{2}"$ , use type IPS (NOTE: Minimum conduit size for all underground work shall be 1-inch)
    - i. Example part number for 1": 10C-XW-32
  - II. For 2" 6", use type ID
    - i. Example part number for 2": 20D-XW-32
- 4) Straight Socket Conduit
  - I. For 3/4" 1 ½", use type IPS (NOTE: Minimum conduit size for all underground work shall be 1-inch)
    - i. Example part number for 1": 10C-XW-10S
  - II. For 2" 6", use type ID
    - i. Example part number for 2": 20D-XW-20-S
- e. Champion Mix Epoxy Adhesive
  - 1) For ambient temperatures 40 70 degree F, use type CM-2040-SFG
  - 2) For ambient temperatures 70 degree F and above, use type CM- 2070-SFG
- f. Champion Mix Epoxy Adhesive Mixing Tip and Gun
  - 1) Mixing Tip: CM-MT
  - 2) Mixing Gun: CM-AG
- g. A manufacturer's installer training course shall be required for electricians installing the RTRC.

## 2.3 - 2.4 (NOT USED)

## **PART III - EXECUTION**

## 3.1 GENERAL

- A. Install electrical equipment and raceway system conduit in accordance with the recommendations of the manufacturer, the requirements of the National Electrical Code (NEC), local codes, and the contract drawings and these specifications.
- B. Use only persons skilled and licensed in the State of Texas to perform this type of work.

## 3.2 (NOT USED)

## 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Exposed-Outdoor and Non-Chemical Areas Above GroundLevel
  - Utilize 316 stainless steel support channels to install raceways, and any other surface mounted electrical, instrumentation and control equipment. Refer to details shown on the contract drawings.
  - 2. All mounting hardware and straps shall be 316 stainless steel.
  - 3. Run exposed conduit parallel or at right angles to building lines.
  - 4. Secure conduits to all cabinets and boxes with specified hubs and bonding jumpers in such a manner that each system is electrically continuous throughout.
  - 5. Install all conduits as a complete system before wiring is pulled in. Conduits shall be reamed and swabbed clean immediately before wiring is pulled in.
  - 6. Cap conduits during construction to prevent entrance of dirt, trash, and water.
  - 7. Equip conduit across structural joints, where structural movement is allowed with an O.Z./Gedney, or equal, 99% aluminum expansion fittings of that conduit size. Conduit nipples shall have two independent sets of threads. Running threads shall not be used. Where conditions require joining two fixed conduits into a continuous run, a conduit union shall be used.
  - 8. Coat all conduit threads with LOCTITE LB 8014 Food Grade Anti-Seize or approved equal.
  - 9. Maintain 6-inch clearance between conduit and piping and 12-inch clearance between conduit and heat sources such as flues, steam pipes and heating appliances.
  - 10. Arrange conduits to maintain headroom and present a neat appearance.
  - 11. Conduits run above ground shall be supported at least every 10-feet and once in every change in direction and at the end of each straight run terminating in an enclosure and within three feet of every junction box.
  - 12. Secure conduit runs firmly to specified support channels by stainless steel conduit straps or by hangers, as required.
  - 13. Rigid conduit joints to be cut square, threaded, reamed smooth and drawn up tight. Bends or offsets to be made with standard conduit ells. Make field bends with an approved bender or hickey or hub type conduit fittings. Conduit shall contain no more than the equivalent or three (3) 90-degree bends between outlets or fittings.

## B. Exposed Chemical Areas

1. Run exposed conduit parallel or at right angles to building lines.

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- 2. Secure conduits to all cabinets and boxes with specified hubs and bonding jumpers in such a manner that each system is electrically continuous throughout.
- 3. Install all conduits as a complete system before wiring is pulled in. Conduits shall be reamed and swabbed clean immediately before wiring is pulled in.
- 4. Cap conduits during construction to prevent entrance of dirt, trash, and water.
- 5. Equip conduit across structural joints, where structural movement is allowed with PVC expansion fittings of that conduit size.
- 6. Maintain 6-inch clearance between conduit and piping and 12-inch clearance between conduit and heat sources such as flues, steam pipes and heating appliances.
- 7. Arrange conduits to maintain headroom and present a neat appearance.
- 8. Conduits run above ground shall be supported per NEC requirements based on conduit size, at every change in direction and at the end of each straight run terminating in an enclosure and within 12-inches of every junction box.
- 9. Secure conduit runs firmly to specified support channels by fiberglass conduit straps or by hangers, as required.
- 10. Conduit shall contain no more than the equivalent or three (3) 90-degree bends between outlets or fittings.
- 11. NEC approved bender is required for bending PVC conduit. Open flame is not allowed.
- C. Underground Conduit System in Duct Bank System and Conduit Concealed in Concrete
  - Install Schedule 40 PVC conduit underground in steel reinforced duct banks changing to PVC coated rigid galvanized steel conduit at the final factory 90- degree bend, transitioning from underground to the above ground conduit system.
  - 2. The transition from PVC coated RGS to aluminum rigid shall be made at a minimum of six (6) inches above finished slab and/or housekeeping pad. Duct bank concrete shall extend six (6) inches above finished grade at all outdoor locations.
  - 3. Duct banks and/or conduit banks shall be continuously reinforced along the entire length utilizing No. 4 stirrups at 1'-6" spacing and No. 5 longitudinal bars at all four corners, at a minimum. Provide 1'-6" overlap splices on all longitudinal bars.
  - 4. Conduit support chairs shall be spaced at 5'-0" minimum spacing.
  - 5. Duct banks shall be encased in red concrete to its final destination even when routed under building/structure, concrete floor slab, and/or equipment concrete/housekeeping concrete pad. Rebar shall be kept a minimum of two (2) inches off of the ground to allow complete concrete coverage. Concrete shall be 3000 psi. A red add mixture, HBS #120 Conduit Red as manufactured by ChemSystems, Inc., or equal, shall be added to the concrete at a minimum of 12 pounds per cubic yard of concrete. Forms shall be used unless the trench wall is stable enough to support the concrete.
    - a. All form boards shall be removed after concrete has been poured and set.
    - b. Stay-form may be used in lieu of form boards. Minimum clearance between form and reinforcing steel is maintained and the Stay-form does not tie to the duct bank rebar.
  - 6. Cap conduits during construction to prevent entrance of dirt, trash, and water.

- Provide a minimum of 2-inches separation utilizing Plastic conduit chairs between conduits installed in concrete duct bank. Spacing may be less at panel boards, pull or junction boxes or other locations where the conduits have to be grouped.
- 8. The minimum depth of a duct bank is twenty-four (24) inches to the top of the Concrete.
- 9. Duct bank conduits shall have a minimum of three (3) inches per 100-feet slope from the high point toward the manholes.
- All underground conduit joints shall be waterproofed in accordance with the manufacturer's recommendations
- 11. Backfilling shall be done in such a manner that voids will be minimized. Compact backfill so that it is the same density as the surrounding soil. Excess soil shall be piled on top and shall be well tamped. All rock and debris greater than one (1) inch in size shall be removed from the site.
- 12. Conduits joints to be staggered a minimum of six (6) inches.
- 13. Where a duct bank penetrates or turns up next to a structure, dowel rebar a minimum of four (4) inches into the structure at the point of the structure at a minimum of four locations.
- 14. All duct banks shall be placed under building slab (not in building slab) with longitudinal duct bank steel reinforcement tied to building slab steel reinforcement with an 18-inch overlap.
- 15. Conduits shall penetrate building slab at 90-degrees and shall run in duct banks under building slab and not run parallel though building slabs.
- 16. NEC approved bender is required for bending PVC conduit. Open flame is not allowed.
- 17. Polyethylene Warning Tape
  - a. Warning tape shall be red metal detectable polyester, 6-in minimum width.
  - b. Warning tape legend shall read: "CAUTION: BURIED ELECTRICLINE BELOW".
  - c. Contractor shall place tape 6" below grade on all buried electrical duct banks or as shown on the PLANS.

#### D. Conduit Penetrations:

- Use 3M 20mil corrosion tape to protect raceways for penetrations through walls, floors, and block outs and grout once work is complete. The tape should extend six (6) inches beyond the walls or floors.
- 2. Link-Seal modular seals shall be used for all subgrade conduit penetrations.
- 3. PVC pipe shall be used for all pour-in-place concrete conduit penetrations.
- 4. Penetrations made through fire-rated walls or floors of buildings shall be sealed with appropriate fire-stop material/product.

#### 3.4 - 3.11 (NOT USED)

#### 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

#### **END OF SECTION**

### PART I - GENERAL

### 1.1 SUMMARY

A. Furnish and install all miscellaneous equipment as shown on the PLANS and as specified herein.

## 1.2 RELATED REQUIREMENTS

A. Equipment enclosures shall have NEMA ratings suitable for the location in which they are installed or as indicated on the PLANS.

## 1.3 REFERENCES

- A. DIVISION 16
- B. Section 16700

## 1.4 - 1.5 (NOT USED)

#### 1.6 SUBMITTALS

- A. Submit to the ENGINEER, in accordance with Section 01300, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.
- B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

## 1.7 - 1.11 (NOT USED)

### PART II - PRODUCTS

## 2.1 (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. Factory Assembled Control Stations
  - 1. Control stations shall be heavy-duty type, with full-size operators. Momentary contact stop buttons shall have a lockout latch that can be padlocked in the open position. Provide an extra contact to monitor the auto position of the switch as shown on the PLANS.
  - 2. Front cover shall be bolted directly to the box without the use of latches.
  - 3. NEMA 4X enclosures shall be 316 stainless steel.
  - 4. NEMA 7 enclosures shall be copper free sand cast aluminum.

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5. Control stations shall be Allen-Bradley or approved equal.

## B. Wireway

#### 1. Outdoors

- a. NEMA 4X wire way shall be 316 stainless steel with gasketed, piano hinged covers and stainless steel type 316 screws.
- b. NEMA 4X shall be Bulletin F-22 as manufactured by Hoffman or approved equal.
- c. U.L. listed enclosures

#### 2. Indoors

- a. NEMA 12 wire way shall be painted carbon steel, ANSI #61 Gray, piano hinged covers and gasketed.
- b. NEMA 12 shall be Bulletin F-20 as manufactured by Hoffman or approved equal.
- c. U.L. listed enclosures

### C. 12 VDC and 120 VAC Control Relays

1. Control relays shall have 11 pin octal base with indicating LED and contacts rated for 10 amps. Furnish 1 Normally Open (N.O.) and 1 Normally Closed (N.C.) spare contacts in addition to those required by the control scheme.

#### D. Timing Relays

1. Timing relays shall have 120-volt coils shall have 11 pin octal base, selectable for on-delay or off-delay functions, and settable for time delays of 0.05 seconds to 999 minutes with 10 amp contact rating. Relays shall be Square D class 9050 type JCK70 or equal.

#### E. Terminal Blocks

- 1. Terminal blocks shall be 600 Volt, channel mounted, with tubular screw and pressure plate.
- 2. Terminal blocks shall be Bulletin 1492 as manufactured by the Allen-Bradley Co. or approved equal.

#### F. Corrosion Inhibitors

1. All equipment enclosures, terminal boxes, etc., located in a NEMA 4X rated area where shown on the PLANS that contains electrical or electronic equipment or terminal strips shall be furnished with an internally mounted, chemically treated corrosion inhibitor pad.

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- 2. The corrosion inhibitor pads shall be as manufactured by Hoffman, 3M or approved equal.
- G. Fuses (0 to 600 Volts)
  - 1. Provide a complete set of current-limiting fuses wherever fuses are indicated. Supply a set of six (6) spare fuses of each type and each current rating installed. Utilize fuses that fit mounting specified:
    - a. For 0 to 600 volt motor and transformer circuits, 0 to 600 amps, UL Class RK-1 with time delay,
      - 1) Bussmann Type LPS-RK,
      - 2) Shawmut Type A6D-R, or equal.
    - b. For 0 to 250 volt motor and transformer circuits, 0 to 600 amps, UL Class RK-1,
      - 1) Bussmann Type LPN-RK,
      - 2) Shawmut type A2D-R, or equal.
    - c. For 0 to 600 volt feeder and service circuits, 0 to 600 amps, UL Class RK-1,
      - 1) Bussmann Type KTS-R,
      - 2) Shawmut Type A6K-R, or equal.
    - d. For 0 to 250 volt feeder and service circuits, 0 to 600 amps, UL Class Rd-1,
      - 1) Bussmann Type KTN-R,
      - 2) Shawmut Type A2K-R, or equal.
    - e. For 0 to 600 volt feeder and service circuits, 601 to 6,000 amps, UL Class L,  $\,$ 
      - 1) Bussmann type KRP-C,
      - 2) Shawmut Type A4BY, or equal.

### H. Indicating Lights

1. Indicator lamps shall be heavy duty 30mm, industrial type oil tight, high-visibility LED, full-voltage type. Units shall have colored screw on plastic lenses and shall have factory engraved legend plates as required. Unless otherwise specified in each equipment specification, lens color shall be green for equipment OFF, red for equipment operating, amber for FAIL and white for power ON/Equipment Standby. For all control applications, indicator lamps shall incorporate a

push-to-test feature.

#### I. Selector Switches:

1. Mode selector switches (HAND-OFF-AUTO, LOCAL-OFF-REMOTE, MOTOR SELECTOR, LEAD-LAG, etc.) shall be heavy-duty 30mm, oil tight, industrial type with contacts rated for 120 VAC at 10 Amps continuous. Legend plates shall be black field with white markings, as indicated on the PLANS. Operators shall be black knob type. Units shall have the number of positions and contact arrangements, as required by the PLANS.

#### J. Push Buttons:

- 1. Push-button shall be heavy-duty industrial type with momentary or maintained contacts as required by the PLANS, rated for 120 VAC at 10 Amps continuous. Legend plates shall be black field with white markings, as indicated on the PLANS. Button color shall be red for START and green for STOP. Contact arrangement shall be as required by the PLANS.
- 2. E-stop push button: Emergency stop push-button shall be red, nonilluminated, mushroom type, heavy duty, industrial type with maintained contact, rated for 120 VAC at 10 Amps continuous. Button shall be Eaton HT800 or approved equal. Where indicated on the PLANS, shroud part number Eaton E34TA6 or approved equal shall be used.
- K. Combination starters shall be provided with motor circuit protectors and equipped to provide under-voltage release and overload protection on all three phases. Combination Starter is applicable for single motor starter only. Refer to section 16700 for further details.
- L. Enclosures shall be NEMA 4X 316 stainless steel for outdoor applications and NEMA 12 for indoor applications.

#### M. Lighting Contactor

- 1. Lighting contactor shall be of the electrically operated, mechanically held type mounted in NEMA 12 enclosures (except where noted otherwise on the PLANS) with number of poles as noted on the PLANS. Operating coils shall be rated for 120 Volts unless otherwise indicated on the PLANS and shall be for momentary operation. Provide with "Hand-Off-Auto" switch on cover where shown on the PLANS.
- 2. Contactors shall be rated for 20 Amps, 600 VAC and shall be ASCO 918 or approved equal.

#### N. Photocells

- 1. The photocells shall be suitable for power duty with individual fixtures or for pilot duty with contactors as detailed on the PLANS.
- 2. 120V Photocell shall be Precision P2275 or approved equal.

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- 3. Locking type receptacle shall be Precision M2A or approved equal.
- O. Intrusion Switch: Surface mount aluminum housing contract with armored cable Interlogix Model 2507 ADL or approved equal.
- 2.3 2.4 (NOT USED)

## **PART III - EXECUTION**

- 3.1 3.3 (NOT USED)
- 3.4 REPAIR/RESTORATION
  - A. As described in Section 16010.
- 3.5 3.6 (NOT USED)
- 3.7 CLEANING
  - A. As described in Section 16010.
- 3.8 (NOT USED)
- 3.9 STORAGE, HANDLING AND PROTECTION
  - A. As described in Section 16010.
- 3.10 3.11 (NOT USED)
- 3.12 MEASUREMENT AND PAYMENT
  - A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

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### **PART I - GENERAL**

### 1.1 SUMMARY

- A. Provide, furnish and install all electrical wire/s, conductor/s and cable/s (WCC) for all electrical, instrumentation and controls (EIC) work , as applicable and required, to make all electrical system/s complete and satisfactorily operable as specified here-in and designated per the Contract PLANS. Coordinate WCC accordingly for instrumentation and controls (I&C) requirements and applications.
- B. All WCC work shall comply per the National Electrical Code (NEC), all applicable federal, state, and local codes, regulations and ordinances.

## 1.2 RELATED REQUIREMENTS

- A. DIVISION 16 Electrical
- B. DIVISION 17 Process Instrumentation and Controls System, PICS
- C. ALL PROCESS AND/OR MECHANICAL PACKAGED SYSTEM/s --having electrical, instrumentation and control system/s, WCC, components, devices, etc. Reference all applicable and respective, related packaged system/s specification section/s, accordingly.
- D. Other related work as may be designated, required, and/or called for per the CONTRACT DRAWINGS, other related TECHNICAL / EQUIPMENT SPECIFICATIONS and/ or as elsewhere defined or designated.

#### 1.3 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
  - 1. NFPA 70: National Electric Code
  - 2. U.L. 44: Thermoset-Insulated Wires and Cables
  - 3. U.L. 510: Polyvinyl chloride, polyethylene, and rubber insulated tape
  - 4. U.L. 1685: Vertical Tray Fire Propagation and Smoke-Release test for electrical and fiber optic cables
  - 5. IECA S-95: Power Cables rated 2000V or less for distribution of electrical Energy
  - 6. NECA WC-70: Power Cables rated 2000V or less for distribution of electrical Energy

- 7. ASTM B8: Standard Specification for concentric-lay, stranded copper conductors --hard, medium-hard, and soft
- 8. OWNER's Conductor Color Code standard –as designated here-in: Section 16200, 1.05D.
- **1.4 1.5** (NOT USED)

#### 1.6 SUBMITTALS

- A. Submittal/s per product information –catalog data sheets, product ratings, etc. per requirements and compliance per Division 1 General Provisions, Section 01300, "Submittals".
- **1.7 1.10** (NOT USED)

#### 1.11 OPERATION AND MAINTENANCE MANUALS

A. Operations and Maintenance (O&M) Manuals –include all approved WCC submittals in the CONTRACT O&M per Section 01730.

### **PART II - PRODUCTS**

**2.1** (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. Multi-conductor I&C cable/s: Color coding is specified in the multi-conductor cable type specification--as designated per the multi-conductor cable manufacturer.
- B. Power and control WCC: provide single conductor/s with integral insulation pigmentation of the designated and/or required color. Phase colors as listed below shall be provided in all instances.
- C. Phase A, B, and C implies the direction of positive phase rotation for AC power voltage.
- D. Implement OWNER's authorized conductor color code as designated below:
  - 1. Electric Power WCC compliance per COA, Austin Energy Utility

System voltage/s	Conductor	Conductor Color
a. All systems	Ground	Green
	Hot Leg, L1	Red
b. 120/240 volts,	Other Hot Leg, L2	Black
1-phase, 3-wire	Neutral, grounded	White

	Phase A	Red
c. 120/208 volts,	Phase B	Black
3-phase, 4-wire	Phase C	Blue
	Neutral, grounded	White
	Phase A	Brown
d. 277/480 volts	Phase B	Yellow
3-phase, 3-wire *	Phase C	Purple
	Neutral, grounded *	Gray *

\* 3-phase, 4-wire service drop from the power company; neutral is pulled and grounded at first main disconnect only; neutral conductor shall not be installed in electrical power distribution system -- thereby standard practice does not utilize 277V, 1-phase power (line to neutral)

e. Motor space heater/s @ 120 volts, 1-phase wrapped	Hot Leg Neutral	Black Black w/white color vinyl tape
f. DC circuit installed in raceway	Positive (+) Negative (-)	Blue Brown

2. Control Panel WCC shall be rated 41 strand, tinned copper, 600V insulation --rated Type SIS --- WCC color code as follows:

a.	AC controls wire	Red
b.	Annunciator contacts	Yellow
c.	DC controls	Blue
	DC (+) power	Red
e.	DC (-) power	Black
f.	AC Hot	Black
g.	AC Neutral	White
h.	PLC/RTU discrete Input	Purple
i.	PLC/RTU discrete Output	Pink

- E. All WCC shall be color coded and tagged per COA, FE AW standard per section 16205 "Wire and Cable Tagging".
- F. Use the manufacturer's name, model or catalog number, if for purpose of establishing standard quality.
- G. Splices are not approved –exception at lighting fixture/s and convenience receptacles.
- H. Samples of all WCC shall be submitted when so requested by the ENGINEER/OWNER for the purpose of determining acceptability of the wire. WCC which have been rejected shall not be used at all. Such rejected WCC shall be removed from OWNER's premises.
- I. Multi-conductor cable is NOT APPROVED.

### 2.3 FUNCTIONAL REQUIREMENTS

- A. Single Conductors at 600V insulation rating:
  - 1. Unless noted elsewhere or otherwise designated, all power and control WCC shall be 98% conductivity, soft annealed, stranded copper with 600V insulation -- rated Type XHHW-2. Grounding WCC shall be bare, hard annealed, stranded copper.
  - 2. Use only WCC meeting applicable requirement per UL 44, UL 1685 and IECA S-95-658 (NEMA WC70).
  - 3. Power WCC shall not be smaller than #12 AWG, unless otherwise noted on the Contract PLANS.
  - 4. Control WCC shall not be smaller than #14 AWG.
  - 5. WCC shall be marked every two feet (2'-0") with the size, type and voltage rating as well as the Manufacturer's name and measurement markers.
  - 6. Unless otherwise noted, conductor size/ampacity rating indicated are based on copper conductor. Do not provide conductor smaller than that designated -- comply per N.E.C.
  - 7. Approved WCC manufacturers: Anaconda, Cyprus (Rome), Southwire, Okonite, Triangle, or approved equal.
  - 8. Where flexible power/power and controls cords and cables are supplied, provide same per Type SEOOW rated -- flexible stranded copper conductor/s, 600V insulation rating -with quantity and size conductors as required and/or where designated per the CONTRACT PLANS.
- B. Single Pair Instrumentation Cable #16 AWG, stranded, twisted, shielded pair (2), 98% conductivity copper conductors, 600V insulation and a #16 AWG, stranded, tinned copper drain wire with overall aluminum mylar shield overlapped for 100% pair conductors coverage -- rated Type TC Cable
  - 1. Single pair instrumentation cable shall be designed and fabricated for noise rejection for process control, computer and/or data logging applications. Shall have a PVC overall jacket (35 mils) shall be flame retardant, sun light and oil resistant. Shall be rated for cable tray, conduit and/or other approved raceway. Minimum temperature rating shall be 90-degree C dry locations, 75-degree C wet locations.
- C. Single Triad Instrumentation Cable #16 AWG, stranded, twisted, shielded triad (3) copper conductors, 600V insulation, and a #16 AWG, stranded, tinned copper drain wire with overall aluminum mylar shield overlapped for 100% triad conductors coverage -- rated Type TC Cable

 Single triad instrumentation cable shall be designed and fabricated for noise rejection for process control, computer and/or data logging applications. Shall have a PVC overall jacket (35 mils) shall be flame retardant, sun light and oil resistant. Suitable for installation in cable tray/s, conduit and/or other approved raceway/s. Minimum temperature rating shall be 90-degree C dry locations, 75-degree C wet locations.

## D. Equipment Grounding Wire/Conductor:

- 1. Provide stranded, copper conductor/s as designated, shown and required per N.E.C. for electrical system grounding and equipment grounding.
- 2. Provide conductor/s with green color, 600V insulation, minimum thickness of 1/32 inch -- rated Type XHHW-2.
- E. All control panel wiring shall be flexible, 41 strand, tinned copper, 600V insulation, Type SIS -- not smaller than #14 AWG (unless approved by Austin Water), color coded as outlined here-in per section 16200 2.02 D.2.
- F. All WCC shall be new, unused, in good condition and shall be delivered in standard coils, packages or reels. If wire used is different than what is specified, samples of wire shall be submitted for the purpose of determining acceptability of the wire. Wire which has been rejected shall not be used again. Such rejected wire shall be removed from the Owner's premises. Decisions as to the quality of the wire furnished and the acceptance of such wire shall be made by the Owner or his representative.
- G. Power conductors shall not be smaller than No. 12 AWG, except for control and alarm wiring where No. 14 AWG shall be used as minimum size wire when protected by a 15 amp fuse/circuit breaker.
- H. The contractor may, if he deems it necessary or advisable, use larger sized conductors than those required. In no case shall there be a voltage drop greater than that allowed by the N.E.C.

## **2.4** (NOT USED)

## **PART III - EXECUTION**

#### 3.1 GENERAL

- A. Do not exceed WCC manufacturer's recommendations for maximum pulling tension and minimum bending radii. Pulling compound shall be used. Use only UL listed compound compatible with WCC outer jacket and with the raceway utilized.
- B. Contractor shall provide and install all low voltage (120V, 208V, 240V, 480V, etc.) WCC for power distribution equipment and associated hardware designated and required per the CONTRACT PLANS.
- C. Tighten all screws and terminal bolts using torque type wrenches, and/or

drives to tighten to the inch-pound requirements of the NEC and UL.

D. When single WCC in man-holes, hand-holes, vaults, cable trays and other designated location and/or raceway(s) are not wrapped together by some other means, such as arc and fireproofing tapes, bundle throughout their exposed length conductor(s) entering from each conduit/raceway with nylon, self-locking, releasable cable ties placed at interval not exceeding 12 inches on-centers.

## **3.2 PREPARATION** (NOT USED)

## 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Support all conductors in vertical conduits or raceways in the manner set forth in Article 300-19 of the latest revision of the National Electric Code. Do not use lighting fixtures for raceways or circuits other than parallel wiring of fixtures.
- B. Do not make any splices or taps in any conductor except where absolutely required for 120 volt circuits feeding lights or receptacles. Such splicing may only take place in splice/junction boxes. Elapsed time meters are the only exception to not using a junction box.
- C. Tag all power wiring in all pull boxes, wire ways, motor control center wire ways, panel board wiring gutters, light switch boxes, receptacles, disconnect switches etc. Use heat shrinkable slip-on type tags, approved for this use, as manufactured by Raychem, 3M, Panduit, or owner approved equal. See Section 16205, Wire and Cable Tagging Standard for additional requirements.
- D. All interconnect wiring going from one compartment to another, or between two separate pieces of equipment must terminate at a terminal block on each end, i.e. entering and leaving a compartment or piece of equipment.
- E. All wiring passing between cabinets shall be protected by a rubber grommet or approved nipple with bushings.
- F. All wire terminations shall be made with a mechanical compression type lug or terminal specifically designed to accept stranded wire. Do not terminate by wrapping the wire around the screw.
- G. Number 8 AWG and larger wire shall utilize a crimper with a die set to install lugs to the wire.
- H. No more than two wires/ lugs per terminal will be allowed unless ring type lugs are used. A maximum of three wires will be permitted if all wires are using ring lugs.
- I. All current transformer loops shall utilize ring terminals and shorting terminal boards to avoid open circuiting the secondary of a CT.
- J. All wiring run to the front door panel shall have a spiral wrap and tie wrapped to protect wires from being pinched between door and panel. A

loop (slack) in conductor(s) shall be provided to allow door to open freely.

- K. All main panel wiring shall be run in a raceway such as Panduit. All wiring run from the Panduit to the devices shall be neatly run and tie wrapped. If Panduit is not practical, wires shall be neatly run and tie wrapped.
- L. Equipment grounding wire run in conduit shall have an identifying green covering or green color coding at each end terminations and at junction box or pull box locations along its run length.
- M. Where the capacity of a single feeder is great enough to require parallel conductors in more than one (1) conduit, each conduit must contain the same number and length of conductors in all phases (legs) of the feeder, including any neutral conductors per the N.E.C.
- N. Under no circumstance shall circuits above 600 volts and those below 600 volts be pulled in the same conduit.
- O. Separate low level circuits (such as phone line) from noisy and power circuits by a minimum distance of 1 foot.
- P. Bolted and compression connections/terminations for electrical conductors shall be thoroughly cleaned, covered, and sealed with a light, pliable, waterproof film of commercial paste or sealant to prevent oxidation and/or corrosion. Apply sealant to cover complete conductor termination and cover/extend past end of conductor insulation. This is typically required for Wastewater Facilities and hazardous, damp and/or corrosive areas. Acceptable conductor/termination sealant manufacturers are Noalox or approved equal. Include sealant submittal data with WCC submittals.
- Q. Where mechanical assistance is used for pulling conductors, a wire pulling compound shall be used (Polywater, or approved equal, as indicated by conductor manufacturer) having inert qualities that do not harm the wire insulation or covering and shall be free from grease, filings or foreign matter before conductors are pulled. Do not exceed cable Manufacturer's recommendations for maximum pulling tensions and minimum bending radii.
- R. Wiring shall be tagged with Raychem Wire Markers, or approved equal, at panel boards, and all termination points with numbers conforming to Section 16205. Power wiring labels shall be white with black letters.
- S. Lighting and receptacle wiring may use silicone filled spring type wire connectors in approved locations. This applies to lighting and receptacle circuits only.
- T. In no case shall DC voltage circuits and AC circuits be pulled in the same conduit or raceway.

#### **3.4 - 3.7** (NOT USED)

## 3.8 TESTING AND INSPECTION

- A. Field test, check and inspect all installed WCC --- comply per requirements per Section 16950 "Calibration and Testing".
- **3.9 3.11** (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

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#### **PART I - GENERAL**

#### 1.1 SUMMARY

A. This specification section establishes the wire, conductor and cable tagging method to use for all electrical, control and instrumentation systems for the Austin Water.

## 1.2 RELATED REQUIREMENTS

- A. Work as called for on PLANS, or in this or other Specification Sections.
- **1.3 1.11** (NOT USED)

## **PART II - PRODUCTS**

**2.1** (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. WIRE, CONDUCTOR AND CABLE TAGGING
  - In general, all wiring shall be tagged at all termination points and at all major access points in the electrical raceways. A termination point is defined as any point or junction where a wire or cable is physically connected. This includes terminal blocks and device terminals. A major access point to a raceway is defined as any enclosure, box or space designed for wire pulling or inspection and includes pull boxes, manholes, and junction boxes.
  - 2. Wire tags shall show both origination and destination information to allow for a wire to be traced from point-to-point in the field. Information regarding its destination shall be shown in parenthesis.
- B. Single Conductor, Wire and Cable Tagging
  - 1. The following is the format to use for single conductor, wire and/or cable tags. Tag information to the left refers to the origination point. Tag information in parenthesis refers to point of destination.

XXXX XX (XXXX-XXXX-XXXXX / XXXX XX)

# Device Terminal Identifier No. (Equipment Tag No.\*/Device Terminal Identifier No.)

\*For wiring within a piece of equipment, control panel, junction box, etc., the Equipment Tag No. is not required, only the Device Identifier and Terminal Number from the point of origination.

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Example: For a wire connected from Terminal block 1 terminal 23 to relay CR1 terminal 9, the correct tag would be TB1-23(CR1-9) at the terminal block and CR1-9(TB1-23) at the relay.

#### C. Device Identifier

 The Device Identifier uniquely identifies a device within a piece of equipment. Examples are: TB1, for terminal block number 1 and CR02, for control relay # 02. For existing equipment, refer to existing device tags or labels and/or equipment documentation. For missing tags or new equipment, consult with OWNER.

## D. Terminal Number

1. The Terminal Number along with the Device Identifier, identify which specific point in the equipment the wire must be terminated to. Refer to manufacturer's labeling or record drawings for device terminal numbers.

## E. Equipment Tag No.

1. The Equipment Tag Number is the physical tag attached to the equipment. For existing equipment, please refer to the Facility in question. For new or missing equipment tags please refer to the Contract PLANS Mechanical Systems for equipment tag identification and/or designation.

#### F. TAG SPECIFICATIONS

Wire tags shall be yellow for control wiring and white for all AC/DC power wiring. Tags shall be heat shrink type as manufactured by Raychem, 3M, Panduit, or OWNER approved equal with the tag numbers typed with an indelible marking process. Character size shall be a minimum of 1/8" in height. Hand written tags are not allowed. Tags shall be heat shrunk once proper installation and operation is completed and verified.

#### **2.3 - 2.04** (NOT USED)

#### **PART III - EXECUTION**

#### 3.1 GENERAL

## A. PULL BOXES, MANHOLES, AND JUNCTION BOXES

1. For all groups of conductors, tags shall be yellow Phenolic with black lettering, attached with black tie wraps. Submit tag sizing and nomenclature to OWNER for approval.

#### **B. DEVIATIONS**

## WIRE AND CABLE TAGGING SECTION 16205

1. For deviations from this wire tagging specification, or for cases not covered by these specifications, submit the proposed tagging system to Austin Water for approval prior to use.

#### C. GRAPHIC DISPLAY

- 1. Comply per the following graphic display/outline for the specified conductor/wire/cable tagging method.
- 2. Single conductor wire tagging within same enclosure and/or equipment.
- 3. Single conductor wire tagging between two separate enclosures and/or equipment.

## **3.2 - 3.11** (NOT USED)

#### 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

Ver. 09/30/15 16205 By AW

### **PART I - GENERAL**

#### 1.1 SUMMARY

Furnish and install lighting and power distribution panelboards where indicated on the PLANS.

## 1.2 RELATED REQUIREMENTS

Work as called for on PLANS, or in this or other Specification Sections.

A. Section 16150 Raceways, Fittings, and Supports

## 1.3 REFERENCES

Requirements listed in the DRAWINGS and specifications are considered additional to the standard requirements listed herein. The publications listed above form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Grounding system shall be designed, constructed, and tested according to the latest applicable sections of the following standards:

NFPA 70	National Electrical Code
U.L. 50	Enclosures for Electrical Equipment, Non-Environmental Considerations
U.L. 67	Standard for Panelboards
U.L. 489	Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures

## 1.4 - 1.5 (NOT USED)

### 1.6 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300 Submittals.
- B. Operations and Maintenance (O&M) Manuals shall be made in accordance with the requirements of Section 01730.

## 1.7 - 1.9 (NOT USED)

#### 1.10 WARRANTY

A. Manufacturer shall provide a one year warranty from the time manufacturer's start-up services are completed or 18 months from date of shipment whichever is later. Warranty shall include all parts and labor to troubleshoot and replace failed devices.

## 1.11 (NOT USED)

#### **PART II - PRODUCTS**

#### 2.1 ACCEPTABLE MANUFACTURERS

A. Square D, Cutler Hammer, General Electric

## 2.2 MATERIALS/CONSTRUCTION

A. Panelboard bus structure and main lugs or main breaker to have current ratings as shown. Such ratings to be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 50°C rise above any ambient of 40°C heat rise tests to be conducted in accordance with U.L. 67. The use of conductor dimensions will not be accepted in lieu of actual heat tests. All bus to be tinned copper, distributed phase sequence type, and extending the full length of the panel board. Circuit numbering to be such that odd numbered circuits are on the left and even numbered on the right facing the front of the panel. Full size (100% rated) insulated neutral bus shall be included in the panel boards shown with neutral. Spaces for future circuit breakers shall be bussed for the maximum devices that can be fitted.

## 2.3 FUNCTIONAL REQUIREMENTS

#### A. CIRCUIT BREAKERS

- 1. Circuit breakers to be single-pole, two-pole or three-pole as shown. All breakers to be quick-make, quick-break thermal magnetic molded case bolt-on type, with inverse time thermal trip and an instantaneous time magnetic trip. Multi-pole breakers to be common trip with a single trip handle; handle ties are not to be used. Provide overload tripping elements in each pole. "ON" and "OFF" position as well as breaker rating to be clearly indicated. A tripped condition to be indicated by the breaker assuming a neutral position between "ON" and "OFF". Provide high interrupting capacity or fused current limiter type breakers where necessary to withstand the available short circuit or limit it to a value which the downstream breakers can withstand.
- 2. Circuit breakers to be equipped with individually insulated, braced and protected connectors. The front faces of all circuit breakers to be flush with each other. Affix large, permanent, individual circuit numbers to each breaker in a uniform position. Provisions for additional breakers to be such that no additional connectors will be required to add breakers. Breakers shall be of the bolt-on type. Independently mount breakers so that a single unit can be removed from the front of the panel without disturbing or removing main bus, other units or other branch circuit connections.
- 3. Circuit breakers for lighting circuit protection are not to be larger than 20 amperes when serving fluorescent or medium base and mogul base incandescent fixtures.
- 4. Circuit breaker interrupting ratings and type to be as follows:
  - a. 120/208 Volt Panels- 22,000 A.I.C. symmetrical @ 208 Volts.

- b. 480/277 volt panels 35,000 AIC symmetrical @ 480 Volts
- 5. Provide GFCI circuit breakers for heat trace circuits. The rating shall be as per NEC.
- 6. Provide individual breaker handle lock for all circuits that supply exit signs, emergency lights and fire alarm panels.

### B. INTEGRATED EQUIPMENT RATING

1. Each panel board, as a complete unit, to have a rating equal to or greater than the integrated equipment rating shown on the panelboard schedule on the PLANS. Such rating to be established by test with the circuit breakers mounted on the panelboard. The short circuit tests on the circuit breaker and on the panelboard structure shall be made simultaneously by connecting the fault of each panelboard breaker with the panelboard connected to its rated voltage source. Method of testing to be per proposed U.L. Standards pertaining to listing of molded case circuit breakers for high-interrupting capacity ratings. The source shall be capable of supplying the specified panelboard short-circuit current or greater. Test data showing the completion of such tests upon the entire range of panel boards to be submitted to the ENGINEER if requested by him/her, with or before the submittal of approval drawings. Testing of panelboard circuit breakers for shortcircuit rating only with the breaker individually mounted is not acceptable. Testing of the bus structure by applying a fixed fault to the bus structure alone is not acceptable.

#### C. CABINET

1. Panelboard assembly to be enclosed in a NEMA 12 cabinet for panel boards installed inside a climate controlled environment (HVAC controlled environment) or NEMA 4X 316 stainless steel cabinet otherwise. The rigidity and gauge shall be as specified in U.L. 50 for cabinets. Size wiring gutters in accordance with U.L. 67. Fronts to be of code gauge, full-finished steel with rust-inhibiting primer and baked enamel finish. All panelboards shall be door in door construction. The inner door shall be a lockable, hinged door to allow access to the circuit breakers for operation. The outer door shall be a bolted, hinged doorway to allow access to the wire way and terminations. A circuit directory in a metal frame with clear plastic covering shall be provided on the inside of each door. A directory card shall be typed to identify the load served by each circuit. Spare breakers shall be noted in pencil. Panelboard cabinet finish shall be "ANSI #61 Gray."

## D. SAFETY BARRIERS

1. The panelboard interior assembly to be dead front with panelboard front removed. Main lugs or main breaker to have a barrier on five sides. The barrier in front of the main lugs to be hinged to a fixed part of the interior. The end of the bus structure opposite the mains are to have a barrier.

#### E. GROUNDING PROVISIONS

1. Each panelboard to have a grounding bar for connecting equipment grounds.

#### F. LABEL

- 1. All panelboards to bear the U.L. label and meet the following Federal Specifications:
  - a. FS W-C-375- Circuit Breakers, Molded Case, Branch Circuit and Service
  - b. FS W-P-115- Power Distribution Panel

## 2.4 TOOLS, SPARE PARTS AND ACCESSORIES

A. Provide a minimum of 20% spares on all panelboards and/or as shown on panel schedules on the drawings.

## **PART III - EXECUTION**

## 3.1 - 3.2 (NOT USED)

## 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

- A. Install panelboards at the location shown on the drawings.
- B. Mount panelboards so that the bottom of the panel board is 3'-0" from the floor. Mount at a lower height if necessary where the top breaker would otherwise be more than 6'-6" above the finished floor elevation.
- C. Balance phases as closely as possible and provide typed directory. Use erasable pencil to indicate "Spares" and "Spaces."
- D. Identification: Give panelboard characteristics on 3-ply phenolic "Black White-Black" laminated nameplate with 1/2" lettering. The nameplate shall have a minimum thickness of 1/8".

Example: Lighting Panel "LP"

120/240 volt, 1-phase

Feeder from MCC-A

E. Use Unistrut or approved equal 316 stainless steel channel supports and fittings for installation, i.e., do not mount/support any panel board directly to building walls.

### 3.4 REPAIR/RESTORATION

A. As described in Section 16010.

## 3.5 - 3.6 (NOT USED)

## 3.7 CLEANING

A. As described in Section 16010.

## 3.8 (NOT USED)

## 3.9 STORAGE, HANDLING AND PROTECTION

A. As described in Section 16010.

## 3.10 - 3.11 (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

## **PART I - GENERAL**

### 1.1 SUMMARY

Provide electrical grounding system in accordance with the design DRAWINGS, these Specifications and compliance per the NEC. Included within this section are furnishing and installing all wire/cable, ground electrodes, ground connections, ground wells/test wells, ground plates, etc. and ground testing report associated with the electrical grounding system.

## 1.2 RELATED REQUIREMENTS

A.	01300	Submittals
В.	01730	Operation and Maintenance Manuals
C.	16010	Electrical General Provisions
D.	16130	Boxes and Cabinets
E.	16140	Wiring Devices
F.	16150	Raceways, Fittings, and Supports
G.	16200	Wiring, Conductors and Cable – 600V and Below
н.	16205	Wiring and Cable Tagging
I.	16950	Calibration and Testing

J. Other related work as may be designated, required, and/or called for per the CONTRACT DRAWINGS, other related TECHNICAL / EQUIPMENT SPECIFICATIONS and/ or as elsewhere defined or designated.

### 1.3 REFERENCES

Requirements listed in the DRAWINGS and specifications are considered additional to the standard requirements listed herein. The publications listed above form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Grounding system shall be designed, constructed, and tested according to the latest applicable sections of the following standards:

Α.	ANSI	American National Standards Institute
В.	ASTM	American Society for Testing and Materials
C.	IEA	International Energy Agency
D.	IEEE	Institute of Electrical and Electronics Engineers
E.	NEC	National Electrical Code

- F. NEMA National Electrical Manufacturers Association
- G. NFPA National Fire Protection Association
- H. UL Underwriters Laboratories
- I. AEIC Association of Edison Illuminating Companies
- J. IAE Instrumentation and Electrical
- K. ISA International Society of Automation
- L. ISO9001 International Organization for Standardization

## 1.4 - 1.5 (NOT USED)

#### 1.6 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of Section 01300 and Section 16010. In addition the following specific information here in shall be complied.
- B. Submittal Data: Submit the following data for grounding system, accessories and appurtenances:
  - 1. Manufacturer and model number(s) for all system components furnished and installed.
- C. Submit data for grounding equipment, grounding systems, materials and terminations.

## **1.7** (NOT USED)

## 1.8 DELIVERY STORAGE AND HANDLING

A. Grounding equipment, materials, supplies, etc. shall be stored off the ground and kept dry at all times, up through the time of installation. Handle with care to prevent damage, loss or compromise of its packing material.

## 1.9 - 1.10 (NOT USED)

### 1.11 OPERATION AND MAINTENANCE MANUALS

- A. Furnish complete documentation and quantity per Section 01730. As a minimum, O & M Manuals shall provide the following:
  - 1. All grounding testing data and report(s), per Section 16950.

#### **PART II - PRODUCTS**

## 2.1 (NOT USED)

## 2.2 MATERIALS/CONSTRUCTION

- A. Ground plate thickness shall be 0.032" with a minimum surface area of 24" x 24" (ThermOweld Part# 38-6341-"X" or approved equal). The ground plate should have manufacturer terminated welded pigtails (sized as indicated on the Plans) or as designated per the design DRAWINGS.
- B. Contractor shall use ground enhancement material (GEM) around ground plates (ThermOweld Part# 38-6502-"XX"). GEM shall be mixed per manufacturer's instructions to encapsulate ground plates.
- C. Ground connection and wire/cable shall be as follows:
  - 1. Below grade: Cadweld, Burndy Thermoweld, or approved equal thermite reaction welding system ground connection.
  - Above grade: Burndy Type GAR, GB, GBM or GG connector as required or approved equal. Where applicable and/or as designated, install thermite weld ("Thermoweld, Cadweld, etc.") ground cable connection to all designated equipment and/or metal structural grounding above grade.
  - 3. Ground wire shall be green color insulation, stranded, copper conductor XHHW-2 rated for raceways/conduits and bare, stranded, annealed copper wire/conductor for underground ground grid, ground loop/s, etc. Ground wire shall be sized as designated on the designed DRAWINGS compliance per N.E.C., not less than #6 AWG service ground and not less than #2/0 AWG bare copper ground for underground ground grid, ground loop/s, etc.
  - 4. Ground well/test well(s) shall be precast box with accessible cast iron lid. Lid shall read "Ground" on top. Brooks precast box, model # 3- RT, not less than 10" DIA x 12" deep or approved equal—see applicable ground well detail per the Contract Drawings. Ground well/s located in driveway shall have AASHO H-20 traffic load rating.

## 2.3 - 2.4 (NOT USED)

## **PART III - EXECUTION**

#### 3.1 - 3.2 (NOT USED)

## 3.3 ERECTION, INSTALLATION, AND APPLICATION INSTRUCTIONS

## A. Ground Grid

1. Install the number of ground electrodes, ground wells/test wells as shown on the DRAWINGS.

- Do not cover/backfill below grade/concealed connections until each connection has been inspected by the ENGINEER / Austin Water. Where applicable and/or as designated, ditto this process for above grade ground connections to designated equipment and to metal structural ground connections.
- 3. Provide minimum of one ground test well accessible for ground grid testing and connection inspection. Utilize a ground test well with removable cover for accessibility from finished grade—comply as specified here-in.

### B. General Equipment Grounding

- 1. Ground all electrical equipment, lights, receptacles, etc., with a separate equipment ground wire/conductor installed in the conduit with the power conductors. Provide/install ground wire/conductor in all conduit/raceway compliant per N.E.C.
- 2. Install grounding system electrically and mechanically continuous throughout. Do not bond to the system neutral except at the service transformer or service main disconnect switch or breaker.
- 3. Install a bonding jumper from the grounding lug on each conduit to the ground bar or bus.
- C. Where the equipment has no facility to attach an equipment ground wire, use a Burndy Quicklug or equal. Clean the metal surface under the lug to bright metal so that good contact can be made. Size general equipment ground wire not less than #10 AWG, stranded copper; major equipment—panel board, motors, compressors, etc. ground wire size shall comply per N.E.C. for equipment grounding and/or per the design DRAWINGS.
- D. Provide a PVC sleeve where bare ground wire passes through concrete slab at or above ground level, where applicable.
- E. Connect ground wires entering outlet boxes in such a manner that removal of the receptacle will not interrupt the continuity of the grounding circuit. A grounding screw attached to the box, and used for no other purpose, may be used to accomplish this.
- F. Install a separate ground plate for lighting poles. Ground plate to be brought up through light pole foundation into base of light pole accessible via pole base hand hole. Make lighting pole ground connection to the ground plate inside the pole base (See DRAWINGS detail).
- G. Ground system "resistance" shall measure not more than 2.0 Ohms for power / instrumentation / communications / computer / network systems.

### 3.4 - 3.7 (NOT USED)

#### 3.8 **TESTING AND INSPECTION**

- A. Ground system shall be calibrated and tested. Provide ground system test data and report/s -compliance per Section 16950 "Calibration and Testing".
- B. Do not cover/backfill below grade/concealed connections until each connection has been inspected by the ENGINEER / Austin Water. Where applicable and/or as designated, ditto this process for above grade ground connections to designated equipment and to metal structural ground connections.

#### 3.9 - 3.11 (NOT USED)

#### 3.12 MEASUREMENT AND PAYMENT

Α. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

#### PART 1 GENERAL

#### 1.1 WORK INCLUDED

A. Furnish and install a lightning protection system.

#### 1.2 REFERENCE STANDARDS

- A. Comply with all requirements and codes of the National Fire Protection Association, the United States Bureau of Standards, and the Underwriters' Laboratories, Inc.
- B. Electrical Component Standard: Provide work complying with applicable requirements of NFPA 70, "National Electrical Code".
- C. NFPA and UL Compliance: Comply with requirements of NFPA Standard 78 and UL Standard 96 as applicable to lightning protection systems for building permits.
- D. LPI Compliance: Comply with requirements of Lightning Protection Institute (LPI) Standards 175, 176, and 177, pertaining to lightning protection system material, components, installation, and quality assurance procedures.
- E. UL Compliance: Comply with UL Standards 96 and 96A.
- F. ANSI Compliance: Comply with applicable requirements of ANSI Standard C2.

#### 1.3 SUBMITTALS

A. Submit detailed installation drawings with complete description of all materials used, including cable, terminals, and supports, as specified in Division 1 - General Provisions. This submittal shall be approved before any devices, wiring, or conduits are installed on the project.

#### 1.4 QUALITY ASSURANCE

- A. Subcontractor: For this work engage the services of a subcontractor regularly engaged in designing and installing lightning protection systems. The subcontractor must be accredited by the Underwriters' Laboratories, Inc. The subcontractor must employ competent personnel fully qualified in this work and able to meet existing local labor conditions.
- B. Master Label: Upon completion, the lightning protection system must be inspected by the Underwriters' Laboratories, Inc. The system must qualify for a Master Label issued by UL and presented to the Owner.

#### PART 2 PRODUCTS

## 2.1 MATERIALS

A. Cables: Provide 16-gauge tin copper conductors with a minimum of 29 strands.

- B. Air Terminals: Use chrome-tipped solid copper with copper or tin plated-bronze base.
- C. Fittings: Supply tinned fitting of bolted type construction.
- D. Screws and Anchors shall be stainless steel 316.

#### 2.2 ACCEPTABLE MANUFACTURERS

A. Furnish all materials from ERICO, Robbins Lighting Inc. or approved equivalent. Other manufacturers will not be accepted unless their products are approved by the Underwriters' Laboratories, Inc.

### PART 3 EXECUTION

### 3.1 INSTALLATION

A. Install conductors to ground devices in accordance with the specific code provisions of Underwriters' Laboratories, Inc. Securely bond all conductive metals within 6 feet of the lightning protection system. Make underground metal water pipes extending into building an integral part of the grounding system. Conceal all down conductors. Any exposed conductors must be approved by the Engineer.

#### 3.2 FUTURE EXPANSION

A. Install the system for ease of future expansion.

#### 3.3 CORROSION PROTECTION

- A. Use no combination of materials that may form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture, unless moisture is permanently excluded from the junction of such metals.
- B. In order to meet UL96A requirement and to obtain a Master Label, contractor may submit a letter to request to switch to the appropriate aluminum equivalent where in contact with galvanize metal surfaces. Bi-metal connector shall be added at the transition to prevent galvanic corrosion. Cooper components shall be used when installation is not on these metal surfaces.

#### 3.4 GROUNDING AND BONDING

A. Provide equipment grounding and bonding connections sufficiently tight to assure permanent and effective grounds and bonds.

#### PART 4 MEASUREMENT AND PAYMENT

4.1 No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

**END OF ECTION** 

#### PART 1 GENERAL

#### 1.1 WORK INCLUDED

- A. Furnish and install a functional control panel to operate the control system as specified in the detailed mechanical equipment requirements of this Section.
- B. Obtain all required control descriptions and data from the detailed mechanical equipment requirements to this Section, the System Description and the control schematic diagrams on the Electrical Contract Drawings.
- C. Provide control system engineering to produce custom elementary drawings showing interwiring and interlocking with remote devices.
- D. All control devices, unless specified otherwise, shall be mounted in the control panel.
- E. This section includes control panels supported by equipment Manufacturer's to manually or automatically operate the mechanical equipment.

#### 1.2 REFERENCE STANDARDS

- A. Institute of Electrical and Electronics Engineers (IEEE).
- B. National Electrical Manufacturers Association (NEMA).
- C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

### 1.3 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01300, shop drawings and product data. The documents submitted shall contain but not be limited to the following:
  - 1. Equipment outline drawings showing elevation, plan and interior views, front panel arrangement, dimensions, weight, shipping splits, conduit entrances and anchor bolt pattern. Indicate all options, special features, ratings and deviations from this Section. Furnish complete Bill of Materials indicating Manufacturer's part numbers.
  - 2. Power and control schematics including external connections. Show wire and terminal numbers and color coding.
  - 3. Instruction and replacement parts books.
  - 4. Certified shop test reports.
  - 5. As-built final drawings.
  - 6. Field tests and inspection reports.

## 1.4 QUALITY ASSURANCE

- A. A factory authorized service and parts organization shall be able to respond to any service call for the project within 8 hours. Provide the name and address of the factory authorized service and parts organization nearest to the project location at the time of the bid.
- B. Equipment components and devices shall be UL labeled to the extent possible wherever UL standards exist for such equipment.

C. The control panel Manufacturer shall demonstrate at least three years of continuous field operating experience in control panel design and fabrication. Submit customer/user list with telephone numbers, addresses and names of customer/user representatives.

#### 1.5 SYSTEM DESCRIPTION

A. Refer to the detailed mechanical equipment specifications for description of system operation.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Package the control panel for maximum protection during delivery and storage.
- B. Store the control panel indoors in a clean, dry, heated storage facility until ready for installation. Do not install the control panel in its final location until the facilities are permanently weather tight. Protect the control panel at all times from exposure to moisture, chemicals, hydrogen sulfide and chlorine gas.

#### 1.7 PROJECT/SITE REQUIREMENTS

A. The control panel shall consist of a main circuit breaker, a combination motor circuit protector (MCP), magnetic starter and overload relay for each motor, a 120 volt control power transformer with two fuses on the primary and one fuse on the secondary. All control components shall be mounted in one common enclosure. Control switches shall be provided to operate each motor either manually or automatically.

#### 1.8 WARRANTY

A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for a period no less than the controlled equipment warranty.

#### PART 2 PRODUCTS

#### 2.1 **RATING**

- A. The control panel shall operate on a power supply as indicated on drawings.
- B. The overall withstand and interrupting rating of the equipment and devices shall not be less than 35000 amperes R.M.S, symmetrical at 480 Volts. All circuit breakers and combination motor starters shall be fully rated for the above fault current interrupting capacity. Series connected short circuit ratings will not be acceptable.
- C. The complete control panel assembly shall be UL certified or carry a UL listing for "Industrial Control Panels.
- D. The control panel shall meet all applicable requirements of the National Electrical Code.
- E. The control panel enclosure shall be in accordance with the electrical area classification indicated on the Electrical Contract Drawings.

#### 2.2 COMPONENTS

A. The main circuit breaker shall be a thermal-magnetic molded case breaker, Type FCL or provide a main fused disconnect rated 35 kAIC to limit the let thru current. Provide a flange mounted main power disconnect operating handle

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- with mechanical interlock having a bypass that will allow the panel door to open only when the switch is in the OFF position.
- B. A mechanical disconnect mechanism, with bypass, shall be installed on each motor circuit protector, capable of being locked in the "OFF" position to provide a means of disconnecting power to the motor.
- C. Motor starters shall be provided with motor circuit protectors and equipped to provide under-voltage release and overload protection on all three phases.
  - 1. Motor starters shall be 2 or 3 Pole, 1 or 3-phase as required, 60 Hz, 600 Volt, magnetically operated, full voltage non-reversing except as shown on the drawings. NEMA sizes shall be as required for the horsepower shown on the drawings.
  - 2. Each motor starter shall have a 120 Volt operating coil and control power transformer. Starters shall have motor overload protection in each phase. Auxiliary contacts shall be provided as shown on the drawings. A minimum of one N.O. and N.C. auxiliary contacts shall be provided in addition to the contacts shown on the drawings.
  - 3. Overload relays shall be adjustable ambient compensated and manually reset.
  - 4. Control power transformers shall be sized for additional load where required. Transformer primaries shall be equipped with time-delay fuses.
- D. Auxiliary contacts shall be provided for remote run indication and indication of each status and alarm condition. Additional controls shall be provided as specified herein, as required by the detailed mechanical equipment requirements, Division 16, Division 17 and as shown on the Drawings.
- E. All operating control devices and instruments shall be securely mounted on the exterior door. All controls shall be clearly labeled to indicate function and shall be in accordance with the electrical area classification indicated on the Electrical Drawings.
  - Indicator lamps shall be heavy duty, 30 mm industrial type oil tight, highvisibility LED, full voltage type. Units shall have screw on plastic lenses and shall have factory engraved legend plates. Unless otherwise specified in each equipment specification lens color shall be green for equipment OFF, red for equipment operating, amber for FAIL and white for power ON/Equipment Stand-by. For all control applications, indicator lamps shall incorporate a push-to-test feature.
  - 2. Mode selector switches (HAND-OFF-AUTO, LOCAL-OFF-REMOTE, MOTOR SELECTOR, LEAD-LAG, etc.) shall be heavy-duty 30 mm, oil tight, industrial type with contacts rated for 120 VAC at 10 Amps continuous. Units shall have standard size, white field, and legend plates with black markings, as indicated. Operators shall be black knob type. Units shall have the number of positions and contact arrangements, as required. Units shall be single-hole mounting, accommodating panel thicknesses from 1/16-in minimum to 1/4-in maximum.
  - 3. Push-button, shall be heavy-duty, 30 mm, oil tight industrial type with momentary or maintained contacts as required, rated for 120 VAC at 10 Amps continuous. Units shall have standard size, white field, and legend plates with black markings, as indicated. Button color shall be red for START and green for STOP. Contact arrangement shall be as required.
  - 4. E-stop push button shall be red, non-illuminated, mushroom type heavy duty, industrial type with maintained contact, rated for 120 VAC at 10 Amps continuous. Button shall Cutler Hammer HT800 or approved equal.

- F. A six digit, non-resettable elapsed time meter shall be connected to each motor starter.
- G. A failure alarm with horn and beacon light shall be provided as required by contract document. Silence and reset buttons shall be furnished.
- H. The control panel shall be provided with an SPD Unit on the load side of the main circuit breaker. SPD shall be rated 65Ka per mode. SPD shall be provided with over- current disconnecting mean in order to safely remove the SPD while panel is operating.
- I. All interfaces between control panel and remote devices shall be isolated via an interposing relay. Interposing relays shall have contacts rated for 250 VAC and 10 Amps continuous.
- J. An alternator shall be provided to sequence motors as required by contract document.
- K. Control relays and timers shall be as listed in specification section S16191 "Miscellaneous equipment".
- L. Panel mounted timers shall be flush mounted, plug-in type with ranges as shown on the Drawings, or as required by the detailed mechanical equipment specifications and Division 17.
- M. Specific control devices, control descriptions and other data are specified under the detailed specification for the mechanical equipment with which the control panel is supplied.

## 2.3 ENCLOSURE TYPES

- A. The control panel specified herein shall be rated NEMA 12 for panels located indoor, NEMA 4X for panels located outdoors.
- B. Steel enclosures shall be 12 gauge and constructed with continuously welded seams. The panel door(s) shall have continuous hinge with quarter turn latches and neoprene gasket. Door clamps shall be provided. The enclosures shall be Hoffman Concept or an approved equal.
- C. The enclosure shall incorporate a removable back panel on which control components shall be mounted. Back panel shall be secured to the enclosure with collar studs. The enclosure door shall be interlocked with the main circuit breaker by a door mounted operating mechanism. Back panel shall be tapped to accept all mounting screws. Self- tapping screws shall not be used to mount any components.
- D. Print storage pockets shall be provided on the inside of the panel.
- E. Overload tables shall be laminated and adhered to the inside of the door.

#### 2.4 NAMEPLATES MARKINGS AND IDENTIFICATION

- A. Provide 2-in by 5-in, nominal, engraved phenolic master nameplate on the control panel fastened with stainless steel type 316 screws or rivets. Nameplate shall be white with black core, 3/8-in high lettering and shall indicate equipment designation as shown on the Drawing.
- B. Provide legend plates or 1-in by 3-in engraved nameplates with 1/4-in lettering for identification of door mounted control devices, pilot lights and meters.
- C. Provide permanent warning signs as follows:
  - 1. "Danger High Voltage- Keep Out" on all doors.

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- 2. "Warning Hazard of Electric Shock Disconnect Power Before Opening or Working On This Unit" on main power disconnect.
- 3. Arc Flash labels shall be provided for every 480V panel.

### 2.5 CONDENSATION HEATERS

- A. A strip heater shall be mounted inside the control panel.
  - 1. Heater shall be rated 240V, but operated at 120V, single phase, 150 watts, with rust resisting iron sheath.
  - 2. A control thermostat shall be mounted inside the control Panel.
  - 3. The strip heater terminals shall be guarded by a protective terminal cover.
  - 4. High temperature connecting lead wire shall be used between the thermostat and the heater terminals. Wire shall be No. 12 AWG stranded, nickel-plated copper with Teflon glass insulation.

#### 2.6 WIRING

- A. All power and control wire shall be flexible 41 strand #14 AWG, 600 Volt insulation type SIS tinned copper, color coded as outlined in specification S16200 "Wiring, Conductors and Cable 600V and Below" and shall be of the sizes required for the current to be carried, but not smaller than No. 14 AWG. All wiring shall be enclosed in PVC wire trough with slotted side openings and removable cover.
- B. All interconnecting wires between panel mounted equipment and external equipment shall be terminated at numbered terminal blocks.
- C. All control panel wiring shall be numbered at both ends with type written heat shrinkable wire markers. The numbers used shall be as specified in section S16205 "Wiring and Cable Tagging."

#### 2.7 TERMINAL BLOCKS

- A. Terminal blocks shall be 600 Volt rated, rail mounted capable of accepting #22 to #8 wires. Terminal blocks shall be Westinghouse type TBA, Allen Bradley 1492 series rated for a minimum of 25 amps or equal. Each terminal block shall have 20 percent spare terminals, but not less than two spare terminals.
- B. Wires shall be terminated to the terminal blocks with crimp type, preinsulated, ring-tongue lugs. Lugs shall be of the appropriate size for the terminal block screws and for the number and size of the wires terminated.
- C. Provide an AC ground bar bonded to the panel enclosure (if metal) with 20 percent spare terminals.
- D. Provide an intrinsically safe ground terminal bar isolated from the control panel enclosure. Provide 20 percent spare terminals but not less than two spare terminals.
- E. Terminal points for current transformer leads shall be provided with a shorting bar.

## 2.8 SHOP TEST

A. Perform Manufacturer's standard production testing and inspection in accordance with NEMA and ANSI standards.

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## PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Repaint any damage to factory applied paint finish using touch-up paint furnished by the control panel Manufacturer.
- B. Any work not installed according to the Drawings and this Specification shall be subject to change as directed by the Engineer. No extra compensation will be allowed for making these changes.

## 3.2 FIELD TESTING

- A. Check mechanical interlocks for proper operation. Make any adjustments required.
- B. Adjust motor circuit protectors and voltage trip devices to their correct settings.
- C. Install overload heaters per actual motor nameplate currents.
- D. Adjust motor circuit protectors for actual motor nameplate currents.
- E. In the event of an equipment fault, notify the Engineer immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor, the Engineer and the control panel Manufacturer's factory service technician. Repair or replace the equipment as directed by the Engineer prior to placing the equipment back into service.

### PART 4 MEASUREMENT AND PAYMENT

4.1 No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

**END OF SECTION** 

# **PART 1: GENERAL**

# 1.1 Scope

The Uninterruptible Power Supply (UPS) shall provide 120 Volt power and line conditioning for computer equipment during normal conditions and battery power during power outages. Transfer from normal to battery backup shall occur automatically without switching and with no transient power conditions on load side.

## 1.2 Submittal

- A. Submittals shall be made in accordance with the requirements of Specification 01300, "Submittals".
- B. Operations and Maintenance (O&M) Manuals shall be made in accordance with the requirements of Specification 01730.

# 1.3 Operation and Maintenance Manuals

Provide operations manual outlining normal operation, battery replacement and routine maintenance required.

## **PART 2: PRODUCT**

- A. System shall consist of a static dc to ac sine wave inverter, a battery charger, a sealed battery, a monitor, and accessories as required. System shall be DIN-rail mounted. System shall have screw terminals for device connection.
- B. Batteries shall be sealed maintenance free cells. System shall have an operating range of 32°F to 122°F.
- C. System output voltage shall be regulated within plus or minus 5 percent of 120 volts and frequency stability shall be plus or minus 0.3 percent of 60-Hz.
- D. System shall be rated 850 VA, 510 watts continuously. System shall be capable of maintaining 250 watts for 16 minutes. System shall be equivalent to Sola HD SDU-850 or equivalent model.
- E. Unit shall have a 2 year warranty.

## PART 3: MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

#### **END OF SECTION**

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## **PART I - GENERAL**

## 1.1 SUMMARY

- A. This section provides the guidelines for testing of electrical equipment, cable, protective relays, circuit breakers, motor control centers, motors, and related apparatus used in the project's electrical system. This specification does not release the CONTRACTOR or vendor from any further testing required for safe and satisfactory operational commissioning of all electrical and related equipment. All tests shall be completely recorded on applicable, developed forms for the test and calibration requirements. Tests and Calibration Report shall be submitted to ENGINEER/AUSTIN WATER for approval.
- B. CONTRACTOR shall provide and pay the cost of electrical testing by an independent testing firm. Testing firm shall have a minimum of five years of experience in providing acceptance testing for water/wastewater treatment plants. Testing shall be performed per the latest InterNational Electrical Testing Association (NETA) standard.
- C. The CONTRACTOR shall immediately correct all deficiencies discovered during testing and calibration.

# 1.2 RELATED REQUIREMENTS

- A. DIVISION 16 Sections in entirety.
- B. DIVISION 17 Sections in entirety.
- C. Other DIVISION/S related and/or incorporating packaged mechanical/process systems containing electrical, instrumentation and controls (EIC) work.

## 1.3 REFERENCES

- A. InterNational Electric Testing Association Standards (NETA) for acceptance testing of Electrical Distribution Apparatus, Publication 2.001, and IEEE Publication No. 141, are hereby made a part of this section, unless otherwise modified herein.
- B. References, accordingly, as designated per related equipment specification in all Sections per Division 16 and as required/designated per Division 17.
- C. NETA Maintenance Testing Specifications for electrical power distribution equipment and system (latest edition).

#### **1.4 - 1.5** (NOT USED)

## 1.6 SUBMITTALS

A. ALL testing results and calibrations shall be summarized and tabulated in final Testing and Calibration Report/s certified by the testing technician/s.

Final Report/s shall be submitted per Section 01730.

- B. The report shall include the following:
  - 1. Description, purpose, basis and scope of the testing and/or calibration.
  - 2. Field data sheet showing all visual, mechanical and electrical inspection done on the equipment. The data sheet shall show check mark and values of all the testing done, a description of the instrument used for testing and document date of instrument certified calibration (current/valid within the last calendar year) per NIST standards. Where applicable and/or required, show and provide schematic, diagram or drawing of the testing configuration / setup. Utilize project contract plans/drawings as applicable.
  - 3. A summary of the deficiency, concern, repairs and recommendation/resolution.
  - 4. A table showing the final settings of all the adjustable equipment tested.
  - 5. All the testing values shall be in accordance with the latest NETA standard
- **1.7 1.11** (NOT USED)

# **PART II - PRODUCTS**

**2.1 - 2.4** (NOT USED)

# **PART III - EXECUTION**

# 3.1 GENERAL

- A. Air switches Low voltage: Electrical Tests.
  - 1. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground for one (1) minute. Test voltage and minimum resistances shall be in accordance with NETA Standard.
  - 2. Perform contact-resistance test across each switch blade and fuse holder, or perform thermographic survey in accordance with the latest NETA Standard.
- B. Transformers Dry type: Small Transformers: Dry-Type, Air Cooled (600 Volt and below) (less than 100 kVA single-phase or 300 kVA three-phase).
  - 1. Inspect for physical damage, broken insulation, tightness of connections, defective wiring, and general condition.
  - 2. Thoroughly clean unit prior to making any tests.

- 3. Perform insulation-resistance test. Calculate polarization index. Measurements shall be made from winding-to-winding and windings-to-ground. Test voltages and minimum resistance shall be in accordance with NETA Standard. Results to be temperature corrected in accordance with NETA Standard.
- 4. Verify that the transformer is set at the specified tap.
- C. Cables low-voltage, 600V maximum: Electrical Tests.
  - 1. Perform resistance measurements through bolted connections with low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.
  - 2. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
  - 3. Perform continuity tests to insure correct cable connection.
- D. Circuit Breakers Air, Insulated Case/Molded Case: Electrical Tests.
  - Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.
  - 2. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with Manufacturer's published data or latest NETA standard.
- E. Perform a contact/pole-resistance test.
  - 1. Perform adjustments for final setting in accordance with coordination study.
  - 2. Determine long-time pickup and delay by primary current injection.
  - 3. Determine short-time pickup and delay by primary current injection.
  - 4. Determine ground-fault pickup and time delay by primary current injection.
  - 5. Determine instantaneous pickup by primary current injection.
  - 6. Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.
  - 7. Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and antipump function.
  - 8. Verify operation of charging mechanism.

- F. Protective Relays: Electrical Tests.
  - 1. Perform insulation-resistance test on each circuit-to-frame. Do not perform this test on solid-state devices.
  - 2. Perform the following tests on the nominal settings specified by the electrical Engineer of Record:
    - a. Pickup parameters on each operating element.
    - b. Timing tests at two (2) or more points on time-current curve.
    - c. Pickup target and seal-in units.
  - 3. Special tests as required to check operation of restraint, directional and other elements per Manufacturer's instruction manual.
  - 4. Conduct tests to verify satisfactory performance of each control feature.
  - 5. Electrically confirm that CT and VT secondary circuits are intact.

## G. Instrument Transformers:

- 1. Electrical Tests Current Transformers:
  - a. Electrically confirm that CT secondary circuits are intact.
  - b. Perform a ratio verification test of each current transformer. This shall be performed using the voltage method or current method in accordance with ANSI C57.13.1 (IEEE Guide for Field Testing of Relaying Current Transformers).
  - c. Perform insulation-resistance tests on current transformer secondary winding. Value of test voltage on secondary wiring shall be 1000 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
- 2. Electrical Tests Voltage Transformers:
  - a. Perform insulation-resistance tests on voltage transformers, winding-to-winding and windings-to-ground. Value of test voltage on secondary wiring shall be 500 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
  - b. Electrically confirm proper secondary voltage.
  - c. Perform a dielectric withstand test on the primary windings with the secondary windings connected to ground. The dc dielectric voltage shall be in accordance with NETA Standard.
- H. Metering: Electrical Tests.

- 1. Check calibration of meters at all cardinal points.
- 2. Calibrate watt-hour meters to within Manufacturer's published accuracy.
- 3. Verify all instrument multipliers.
- 4. Electrical confirm that CT and VT secondary circuits are intact.
- I. Grounding Systems: Electrical Tests.
  - 1. Perform 3-point fall-of-potential test for all newly installed grounding systems.
    - a. At each grounding test well, Contractor shall separate ground rod and conductors and test grounding grid in all directions to verify resistance to ground for the grid.
  - 2. Perform point-to-point test to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.
- J. Ground-fault protection systems: Electrical Tests.
  - 1. Measure the system neutral to ground insulation resistance with the neutral disconnect link temporarily removed. Replace neutral disconnect link after testing. Notify equipment Owner or operator of any improper neutral to ground connections detected.
  - 2. Measure insulation resistance of the control wiring at 1000 volts dc for one (1) minute. If necessary, disconnect the solid state components.
  - 3. Perform pickup tests as follows using primary injection.
    - a. Verify the relay does not operate at 90% of the set pickup current.
    - b. Determine the pickup current of the relay and verify that this current is no greater than 125% of the setting. Pickup must not be greater than 1200 amperes.
  - 4. For summation type systems utilizing phase and neutral CT's, verify proper polarities by applying current to each phase-neutral CT pair. This test also applies to molded case breakers utilizing an external neutral CT.
    - a. Relay should operate when current direction is the same relative to polarity marks in the two CT's.
    - b. Relay should not operate when current direction is opposite relative to polarity marks I the two CT's.
  - 5. Measure time delay of the relay at 150% of pickup or greater.
  - 6. Verify the system is able to trip with control voltage at 55% of rated

for systems utilizing ac control power and 80% of rated for systems utilizing dc control power.

- 7. Verify operation of zone interlock systems by simultaneously injecting current at the interlocked relays and monitoring the control signals.
- K. AC motors: Electrical Tests Induction Motors.
  - 1. Perform insulation-resistance tests in accordance with ANSI/IEEE Standard 43.
    - a. Motors larger than 200 horsepower: Test duration shall be for 10 minutes with resistances tabulated at 30 seconds, one (1) minute, and 10 minutes. Calculate polarization index.
    - b. Motors 200 horsepower and less: Test duration shall be for one (1) minute with resistances tabulated at 30 and 60 seconds. Calculate the dielectric absorption ratio.
  - 2. Perform DC Overpotential Test (Hipot) on motors rated at 4000 volts and greater in accordance with ANSI/IEEE Standard 95.
  - 3. Perform insulation power-factor or dissipation-factor tests.
  - 4. Perform surge comparison tests.
  - 5. Perform insulation-resistance test on pedestal per Manufacturer's instructions.
  - 6. Perform insulation-resistance test on surge protection device in accordance with NETA Standard.
  - 7. Test motor starter in accordance with NETA Standard prior to reenergizing the motor.
  - 8. Check resistance temperature detector (RTD) circuits for conformance with drawings. Check that metering or relaying devices using the RTD's are of the proper rating.
  - 9. Check that the motor space heater is operating.
  - 10. Perform a rotation test to insure proper shaft direction if the motor has been electrically disconnected.
  - 11. Measure running current and evaluate relative to load conditions and nameplate full-load amperes.
  - 12. Perform vibration tests:
    - a. Motors larger than 200 horsepower: Perform vibration base line test. Amplitude shall be plotted versus frequency.
    - b. Motors 200 horsepower and less: Perform vibration and amplitude test.

- L. Motor Control Centers/Motor Starters, Low Voltage: Electrical Tests.
  - Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
  - 2. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with starter closed and across each open pole for one minute. Test voltage shall be in accordance with Manufacturer's published data and NETA Standard whichever is more stringent.
  - 3. Measure insulation resistance of each control circuit-to-ground.
  - 4. Perform insulation-resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volte rated cable. Test duration shall be one (1) minute. For units with solid-state components, follow Manufacturer's recommendation.
  - 5. Test motor protection devices in accordance with Manufacturer's published data and NETA Standard whichever is more stringent.
  - 6. Test circuit breakers in accordance with NETA Standard.
  - 7. Perform operational tests by initiating control devices.
- M. Surge Arresters, Surge Protection Devices: Electrical Tests.
  - 1. Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
  - 2. Perform an insulation-resistance test at voltage levels in accordance with NETA Standard.
  - 3. Test grounding connection in accordance with NETA Standard.
- N. Fiber-Optic Cables: Field Test.
  - 1. Perform cable length measurement and detect fiber fractures or other defects through analysis of the backscattering signal with an optical time domain reflector (OTDR).
    - a. Perform testing on the reel (prior to pull) and after installation/termination.
  - 2. Perform a continuity test to detect splice fractures or other defects through analysis of the backscattering signal using the OTDR.
  - 3. Perform attenuation measurement of losses at each splice and connector for all types of fiber optic cables.
- O. Lighting

- Turn on all lights after lamping them with new lamps take load readings of each circuit with lights on. Submit type-written results to the Austin Water. Results shall include panel board number and location, branch circuit number and load served, and amperage reading.
- 2. Verify all photocells, time clocks, and lighting contactors are operationally correct and set to the correct time.

# P. Receptacles

1. Test all receptacles for proper connections and grounding. Use an approved plug-in tester (Woodhead 1750 or Hubbell 5200), or equal.

## O. Exhaust Fans

1. Record SCFM and Amps for each exhaust fan installed under this project.

#### R. Control circuits

- 1. Check all circuits for continuity, proper connection, and proper operations.
- 2. Set all time delays relays and timers for the desired operations. Record the settings, indicating the relay or timer, its location, and the setting used. Verify all time settings reflect ENGINEER's direction.

#### 3.2 PREPARATION

- 1. Preparatory Work: Prior to the testing of any specific piece of equipment, the CONTRACTOR shall remove all shipping hardware and inspect for broken or missing parts and proper connections in accordance with the Manufacturer's instructions.
- 2. Visual and Mechanical Inspection: Prior to any electrical testing CONTRACTOR shall perform a visual and Mechanical inspection as specified in the latest NETA standard.

## **3.3 - 3.7** (NOT USED)

## 3.8 TESTING AND INSPECTION

- A. All testing equipment shall have been factory calibrated within one-year of testing. Documentation of factory calibration shall be provided prior to testing.
- B. All tests, other than Low Voltage Systems and Equipment, shall be supervised by the CONTRACTOR. ENGINEER/AUSTIN WATER reserves the right to witness testing and calibration. CONTRACTOR shall give a two-week notice prior to all scheduled tests to the ENGINEER and AUSTIN WATER in writing.

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# CALIBRATION AND TESTING Section 16950

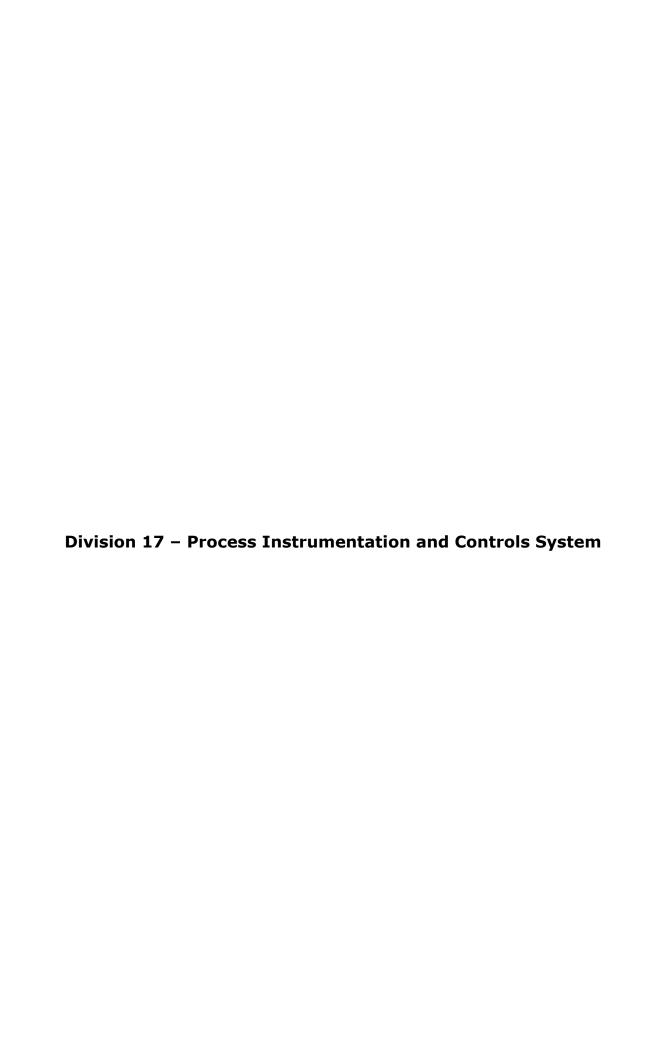
- C. CONTRACTOR shall notify the ENGINEER/ AUSTIN WATER of scheduled dates of electrical equipment installation completion. Equipment testing shall be coordinated by the CONTRACTOR, appropriate Manufacturer's Representative/s and with ENGINEER/ AUSTIN WATER.
- D. CONTRACTOR shall perform electrical tests and calibration on specified equipment and as specified under this Section. The CONTRACTOR shall supply all resources, services, equipment, etc. required to perform all testing and calibration responsibilities.
- **3.9 3.11** (NOT USED)

## 3.12 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

# **END OF SECTION**

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## PART 1 GENERAL

#### 1.1 SUMMARY OF REQUIREMENTS

#### A. Scope

- 1. This section specifies the requirements for the addition of Pressure Point 31 (PP-31) Monitoring Station to the City of Austin (COA) Water and Wastewater Utility. The existing SCADA system is termed the Water Distribution Control System (WDCS). The requirements outlined in this section address general hardware and services necessary to provide the control functions specified. More detailed requirements of specific functions and components are presented in other Division 17 sections that follow.
- 2. The scope associated with the PP-31 addition consists of furnishing all labor, services, materials, tools, equipment, and appurtenances necessary to construct and make PP-31 operational, including the construction and installation of Remote Terminal Units (RTU) and the installation of a new Multiple Access System Remote Radio.
- An existing 900 MHz Multiple Address System (MAS) master radio subsystem is used for communications between the WDCS host system and the existing RTUs. The CONTRACTOR shall provide and install compatible remote radio units for use at the PP- 31 RTU.
- 4. This contract will include, but not be limited to, the following general sequence of tasks:
  - a. Prepare and submit for review comprehensive design submittals
  - b. Procure, assemble, and test RTU and all equipment as specified herein.
  - c. Conduct factory testing
  - d. Ship RTU system to site
  - e. Install RTU and associated equipment
  - f. Perform field testing including startup and cutover
  - g. Provide documentation
  - h. Perform clean-up and close-out activities
  - i. Provide maintenance and warranty services

# B. Description of Existing Conditions

 The CONTRACTOR is advised that the existing Water Distribution System will be in continuous operation throughout the execution of this contract. The CONTRACTOR shall schedule and conduct work so as to minimize interference with system operation and maintenance.

# 1.2 DEFINITIONS

- A. The definitions of terminology used in the Division 17 specifications or in any Section referencing Division 17, shall be as defined in ISA Standard S51.1 unless otherwise specified. Where terms used are not defined in ISA 51.1 or in these specifications, ANSI/IEEE Standard 100-1984, ANSI/ISA S50.1 or other ISA standards shall apply.
  - 1. Signal Circuit: Any circuit operating at less than 80 volts AC or DC.
  - 2. Control Circuit: Any circuit operating at 80 volts AC or DC or more, whose principal purpose is the conveyance of information and not the conveyance of energy for the operation of an electrically powered device.
  - 3. Power Circuit: Any circuit operating at 80 volts (AC or DC) or more, whose principal purpose is the conveyance of energy for the operation of an electrically powered device.
  - 4. Two-Wire Transmitter: A transmitter which derives its operating power supply from the signal transmission circuit and therefore requires no separate power supply connections. As used in this specification, two-wire transmitter refers to a transmitter which provides a 4 to 20 milliampere current regulation of signal in a series circuit with an external 24-volt direct current driving potential and a maximum external circuit resistance of 600 ohms.
  - 5. Electrical Isolation: Pertaining to an electrical node having no direct current path to another electrical node. As used in this specification, electrical isolation refers to a device with electrical inputs and/or outputs which are galvanically isolated from ground, the

# GENERAL CONTROL SYSTEM REQUIREMENTS SECTION 17000

device case, the process fluid, and any separate power supply terminals, but such inputs and/or outputs are capable of being externally grounded without affecting the characteristics of the device or providing a path for circulation of ground currents. The terms "galvanic isolation," "electrical isolation", "isolation", or similar terms shall mean electrical isolation whenever used in Division 17, or whenever used in specifications for electrical control and instrumentation equipment in any other Divisions of these contract documents. Unless otherwise specified, electrical isolation for analog signal devices shall be rated 250 volts AC continuous, and 1500 volts AC for one minute, in accordance with ANSI/IEEE C39.5.

- 6. Panel: An instrument support system which may be either a flat surface, a partial enclosure, or a complete enclosure for instruments and other devices used in process control systems. Unless otherwise specified or clearly indicated by the context, the term "panel" in these contract documents shall be interpreted as a general term which includes flat panels, enclosures, cabinets and consoles.
- 7. Data Sheets: Data sheets as used in this specification shall comply with the requirements of ISA S20.
- 8. Field: When used to refer to locations at the treatment facility or in the transmission system, shall mean all outdoor locations, as well as all process and equipment areas. Unless otherwise specified, all areas shall be considered "field" locations except for: administration and other office areas; control rooms; motor control centers and other electrical equipment rooms; dedicated HVAC rooms; and maintenance buildings.
- 9. Division 17 Work: Whenever the terms "Division 17 work", "specified under Division 17" or "provided under Division 17" are used, they shall be interpreted as referring to all materials, labor, products, services, systems, etc., specified in Sections 17000 through 17999, inclusive, unless equipment shown or specified is clearly labeled as being provided under other parts of the contract.
- 10. WDCS: Water Distribution Control System a processor-based system that provides monitoring and control of the water distribution system process equipment. The term "control system" shall also be considered to refer to the Water Distribution Control System.
- 11. RTU: Remote Terminal Unit. Field installed unit which monitors and controls water distribution system devices. RTUs report to the Front-End Processor via the MAS radio subsystem or other communications media. The Remote Terminal Units contain all logic necessary to monitor and control the distribution system process located at the RTU location.
- 12. SCADA: Supervisory Control and Data Acquisition
- 13. MAS: Multiple Address System 900 MHz radio system used primarily for point-to-multipoint data communications.

### 1.3 REFERENCE STANDARDS

A. This subsection references the latest revisions of the following standards. They are a part of Division 17 as specified and modified. In case of conflict between the requirements of this section and those of the listed standards, the requirements of this section shall prevail.

<u>STANDARD</u>	<u>TITLE</u>	
ANSI/NEMA ICS 6	Enclosures for Industrial Control and Systems	
API RP550	Manual on Installation of Refinery Instruments and Control Systems Part I - Process Instrumentation and Control	
ISA S5.4	Instrument Loop Diagrams	
ISA S20	Specification Forms for Process Measurement and Control Instrumentation, Primary Elements, and Control Valves	

# GENERAL CONTROL SYSTEM REQUIREMENTS SECTION 17000

ISA S50.1 Compatibility of Analog Signals for Electronic

**Industrial Process Instruments** 

ISA S51.1 Process Instrumentation Terminology

#### 1.4 SUBMITTALS

#### A. General

- Submittals shall be made in accordance with the requirements of this section, the requirements of Section 01300, and the requirements of individual Division 17 Sections. The CONTRACTOR shall submit to the OWNER technical data and drawings for all equipment, materials, software, assemblies, and installations prior to fabrication and installation. All submittals shall be made in accordance with the submittal procedures and requirements in Section 01300 Project Submittals and Review. The CONTRACTOR shall be responsible for the accuracy and completeness of all submittals, including information and drawings provided by other suppliers or subcontractors providing equipment, materials, software or services to the CONTRACTOR.
- In all instances in which submittals are required by the Specifications, the CONTRACTOR shall not proceed with the associated work until the submittal has been Successfully Reviewed. Successful Review of a submittal shall be achieved when the CONTRACTOR has received the submittal marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
- 3. Each submittal shall be complete, with all required information provided together at one time, and submitted in a sequence that allows the OWNER to have all of the information necessary for checking and approving a particular document at the time of the submittal. The specified timing requirements for each submittal are minimum requirements. The CONTRACTOR shall be responsible for planning and making all submittals as necessary to avoid delays or conflicts in the work.

## B. Submittal Categories

- 1. Project submittals are divided into the following general categories:
  - a. Design Submittals
  - b. System Documentation Submittals
  - c. Testing Submittals
- The following paragraphs define the specific contents of each of these submittal
  categories. The requirements outlined for each of these submittals shall apply to all
  equipment and services specified in all sections of Division 17. Additional submittal
  requirements may be found in specific sections of Division 17.

# C. Design Submittals

- 1. Product Information
  - a. Format: Product information shall include, but not be limited to: catalog cuts, data sheets, performance surveys, test reports, equipment lists, material list, diagrams, pictures, and descriptive material. The product information shall cover all items including mechanical devices, mounting components, wiring, terminal strips, connectors, accessories, and spare parts. The submittal information shall show the standard and optional product features, as well as all performance data and specifications.
  - b. Requirement: Prior to commencement of manufacture (or shipment for stock items), the CONTRACTOR shall submit for review product information for all equipment and material specified in Division 17, or required to support equipment or systems specified in Division 17. Specific requirements for the form and content of product information submittals is included in the individual section that defines the equipment requirements. Manufacture (or shipment for stock items) shall not begin until the product information submittal has been Successfully Reviewed.

# 2. Connection Diagrams

- a. Format: Connection diagrams shall show the placement, labeling and wiring of components within panels, cabinets and consoles. Components shall be shown arranged in the physical layout (not necessarily to scale), as it would appear to a person servicing the equipment. Wires shall be shown as a continuous line between their termination points. The direction of entry to a wire bundle shall be shown. Wire lists and wireless diagrams shall not be accepted. All additions and deletions of devices and wires in existing enclosures shall be clearly shown. Each wire label designation shall be shown. Wire label designations shall be in accordance with OWNER's wire tagging standards. All wire termination point numbers shall be shown. Each wire color shall be shown. Signal and DC circuit polarities shall be shown. All jumper, shielding and grounding details shall be shown. Wire pairs shall be shown. Spare wires and termination points shall be shown.
- b. Requirement: The CONTRACTOR shall submit connection diagrams for all new panels, cabinets and consoles. The CONTRACTOR shall also prepare and submit connection diagrams for existing panels, cabinets and consoles which are modified or refurbished. Connection diagrams shall be Successfully Reviewed prior to the start of panel assembly. Loop diagrams may not be substituted for connection diagrams.
- 3. Interconnection Diagrams
  - a. Format: Interconnection diagrams shall show the external wiring between terminals of associated equipment, control panels, motor control centers, terminal boxes, field switches, and any other device, panel, or enclosure. Interconnection diagrams shall clearly depict all cable tags. Cable tagging shall conform to the standards provided by the OWNER.
  - b. Requirement: Interconnection diagrams shall be provided for all major system components as an integral part of the O&MManuals.
- 4. Panel Fabrication and Layout Drawings
  - a. Format: Panel fabrication drawings are scaled drawings that shall show the physical dimensions, materials, and construction of panels, cabinets, terminal boards, consoles, or other electrical or mechanical equipment enclosures. These drawings show the physical arrangement and mounting of all components in or on a panel, terminal board, cabinet, console, or enclosure. These drawings show the physical dimensions, and the space and mounting requirements of mechanical, electrical, control and instrumentation devices or pieces of equipment. Other information provided may include ventilation requirements, locations of connections, weight, and paint color, material and dry film thickness.
    - As a minimum, panel fabrication and layout drawings shall include the following:
      - a) Detailed Bill of Materials
      - b) Front, back, and section views
      - Locations of all components to be mounted in or on the panel, cabinet, console, enclosure or assembly
      - d) Nameplate engraving schedule
      - e) Structural materials and supports
      - f) Mounting methods and details for all components
      - g) Power Distribution (AC and DC).
    - 2) All drawings shall be scaled and shall have the drawing scale clearly show. Overall dimensions and minimum clearances shall be shown. Sufficient detail shall be included to demonstrate material choices, outward appearance, construction methods, and seismic force resistance.
  - Requirement: Complete shop drawings shall be prepared and submitted for all panels, cabinets, and consoles which are custom fabricated or modified for this project. The OWNER shall have the right to make modifications to the interior and

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exterior layouts of panels as part of the shop drawing review. No additional compensation will be provided to the CONTRACTOR for changes that result. The CONTRACTOR shall include in his bid price one redesign of the panel layout to incorporate the OWNER's modifications to the locations of specified components in or on each panel, cabinet, console, or enclosure. Panel fabrication shall not be started until panel fabrication and layout submittals have been Successfully Reviewed.

# 5. Installation Drawings

- a. Format: Installation drawings shall show installation arrangements for all provided equipment, mounting and anchoring details, conduit entries into cabinets, electrical power supply distribution and all conduit and wiring. Data sheets and/or catalog cuts for mounting devices, anchors, wire and other incidental installation materials shall be included.
- b. Requirement: At least Thirty (30) days prior to the start of Factory Demonstration Test, the CONTRACTOR shall submit installation drawings. Factory Demonstration Test shall not begin until the system installation drawings submittal has been Successfully Reviewed.

## 6. Loop Drawings

- a. Format: Loop Drawings shall show all electrical and piping connections associated with the instrument loop. Loop drawings shall be developed in accordance with ANSI/ISA-S5.4-1991 and shall be provided with both the minimum and optional content information referenced in this standard. Only one loop shall be shown per drawing. Loop Drawings shall be drawn such that a Full Size print is 11" by 17", landscape format.
- b. Requirement: CONTRACTOR shall develop loop drawings for all analog signals for each RTU. At least Thirty (30) days prior to the start of Factory Demonstration Test, the CONTRACTOR shall submit loop drawings. Factory Demonstration Test shall not begin until the loop drawing submittal has been Successfully Reviewed.

# D. System Documentation Submittals

- 1. Operation and Maintenance Manuals: See Specification Section 01730.
- 2. System Configuration Inventory List
  - a. Format:
    - An inventory list shall be furnished for all contract material, for all contract documentation, spare parts, and test equipment. Hardware identification of each unique module by serial number shall be included on the list. The inventory list shall include, but not be limited to, the following information:
      - a) Manufacturer's name, part number, and serial number
      - b) Quantity of units supplied with the deliverable System/subsystem
      - c) System documentation supplied
      - d) Applicable cabinet, rack number or slot, and cables.
    - 2) The inventory list, which shall be prepared and updated by the CONTRACTOR, shall be subdivided by hardware, test equipment, and spares, and by documentation and training courses. Each of these major divisions shall be further subdivided to the individual deliverable item level, e.g., complete cabinet assemblies which will be shipped intact, and individual spare modules. Each item must be defined in sufficient detail to permit its ready identification in shipping documents and inventory checks.
    - 3) The organization of the inventory list shall include provision for annotating each item with forecast and actual dates for:
      - a) Review (Documentation)
      - b) Shipping and Delivery (All items Except Documentation)
      - c) Factory Demonstration Tests (Hardware)
      - d) Final Acceptance (Spares, Documentation, etc.)
    - 4) The inventory list should be computer-maintained to simplify updating and review access using a Microsoft Access database.

b. Requirement: A preliminary version of the System Configuration Inventory List that demonstrates the form and content to be provided shall be submitted for review within 15 days of Notice to Proceed. A completed System Configuration Inventory List shall be submitted no later than Thirty (30) days prior to the scheduled start of Factory Demonstration Test. The FDT shall not be initiated until the System Configuration Inventory List submittal has been Successfully Reviewed. A System Configuration Inventory List updated to reflect any additions or changes during system installation shall be included as part of the Record Documents.

## 3. Record Documents

- a. Format: After successful Field Testing, the CONTRACTOR shall submit for review the Record Documents (as-built) for all equipment and software installed by the CONTRACTOR. All documents that have changed because of the engineering changes, contract changes, or error or omission shall be updated and the revised documentation provided.
- b. Requirement: The CONTRACTOR, within ten (10) days from successful completion of Field Testing and Startup, shall submit a preliminary version of the Record Documents. Final record documents shall be submitted promptly after review comments are provided. Final Acceptance shall not be considered attained until the final Record Documents submittal has been Successfully Reviewed.

# E. Testing Documentation Submittals

- System Test Plan
  - a. Format: Requirements for the System Test Plan are included in Section 01670.
  - b. Requirement: The CONTRACTOR shall prepare and submit for review a System Test Plan within One Hundred Twenty (120) days after Notice to Proceed.

## 2. Test Procedures

- a. Format: Requirements for Test Procedures are included in Section 01670.
- b. Requirement: The CONTRACTOR shall submit for review a detailed test procedure for each test activity defined in paragraph 17000-3.01. The test procedure shall be submitted at least Thirty (30) days prior to the scheduled test. No test shall be performed less than Seven (7) days after the test procedure has been Successfully Reviewed. If necessary, the CONTRACTOR shall reschedule the test, at no additional cost to the OWNER, so that this requirement is met.

### Test Reports

- Format: Requirements for Test Reports are included in 01670.
- b. Requirement: Within Ten (10) days after the completion of each required test, the CONTRACTOR shall submit a test report. The OWNER reserves the right to delay or suspend follow-on project activities if an acceptable test report has not been provided in the required time period.

## 1.5 ENVIRONMENTAL REQUIREMENTS

# A. RFI/EMI Protection

- All control system equipment shall be capable of operating without error in an environment which has a high electric and magnetic field strength of radio frequency electromagnetic energy. The general guide lines as described in ANSI/IEEE C37.1-1987, "Definition, Specification, and Analysis of Systems Used for Supervisory Control, Data Acquisition, and Automatic Control", Section 6.62 and ANSI/IEEE C63.12, "American National Standard for Electromagnetic Compatibility Limits Recommended Practice", Section 6.3.
  - a. Radiated Immunity Broad Band
    - The equipment shall operate without error under an electric field strength of six V/M and an equivalent conversion for magnetic field strength, assuming a free space impedance of 377 ohms, over a frequency range of 10 kHz to 10 GHz.

- b. Radiated Immunity Narrow Band
  - The equipment shall operate without error or measurable degradation to sensitivity or functionality in the presence of a 900 MHz, hand held radio (HHR) operating at an effective radiated power (ERP) of five watts at a distance of 3 meters from the equipment.
- c. Conducted Immunity Broadband
  - The equipment shall operate without error or measurable degradation to sensitivity or functionality in the presence of unwanted conducted interference coupled onto equipment power lines, communication lines, instrumentation and other miscellaneous signaling cables.
    - a) Common mode voltage immunity of 2 Volts rms
    - b) Differential mode voltage immunity of 2 Volts rms.
- d. Conducted Immunity to Narrow Band Radiators
  - The equipment supplied shall operate without error or degradation to sensitivity or functionality due to induced energy from the operation of intentional and unintentional transmitters within the plant onto communication and power lines serving the equipment supplied by the CONTRACTOR.
- 2. The equipment supplied shall operate without error or degradation of performance in the presence of the following transmitter frequencies which may induce higher differential and common mode voltage levels specified in paragraph c above and which operate at a distance of three meters from the power and communication lines serving the supplied equipment.

Conducted Immunity - Narrow Band Limits				
	Frequency	ERP	Distance	
	(MHz)	(Watts)	(meters)	
1	30 to 300	0.5	3	
2	301 to 500	2	3	
3	501 to 900	5	3	

- B. Environmental Conditions
  - Unless otherwise specified, all equipment provided under this contract shall, as a minimum, be suitable for operation in the ambient conditions specified below.
    - a. Atmospheric Contaminants All Areas

a.	Autic	opricio contaminanto	All Alcas
	1)	Chlorine	0.01 ppm (by weight)
	2)	Ammonia	0.5 ppm (by weight)
	3)	Dust	50.0 ug/m3
b. Control Rooms		_	
	1)	Temperature	64 to 104°F
	2)	Humidity	20 to 80 percent
c. Remote Locations		ote Locations	·
	1)	Temperature	20 to 122°F
	2)	Humidity	10 to 95 percent

- C. Seismic Requirements
  - All equipment supplied shall be designed to withstand the loads specified below.
  - 2. For design purposes, seismic loads in a horizontal direction shall be 1.00W (W being the weight of the equipment) acting at the center of mass. A vertical seismic load shall be 0.67W and shall be considered to act simultaneously with the horizontal load in a direction which produces the most severe equipment and anchorage stresses.
  - 3. The stresses due to seismic loads shall be considered in conjunction with those due to gravity and operating loads.

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- 4. Enclosures shall be provided with a structural frame base which will be anchored to a concrete floor with drilled-in expansion anchors.
- 5. Expansion anchors shall satisfy the requirements of Federal Specification FF-S-325, Group II, Type 4, Class 1. For purposes of designing the equipment base and its anchorage to the concrete floor, the following allowable expansion anchor loads shall be used:

3/8	
1/2 $S = 7001/2$ $C = 7005/8$ $T = 700$	
5/8	
3/4 T = 900 3/4 S = 1600 3/4 C = 1600	
1 T = 1900 1 S = 3100 1 C = 3100	

T = Tension

S = Shear

C = Combined Tension and Shear

# 1.6 WARRANTIES, MAINTENANCE, AND SUPPORT SERVICES

# A. System Warranty

1. The system warranty shall consist of a full scope, in-place warranty. All software and hardware components provided by the CONTRACTOR shall be covered by the warranty. The CONTRACTOR shall coordinate any warranties provided by third party suppliers.

#### B. Preventive Maintenance

1. The CONTRACTOR shall provide the services of factory-trained service technicians, for the period from Notice to Proceed to final acceptance, for the purpose of performing preventive maintenance. All equipment shall be systematically inspected, cleaned, aligned, adjusted, lubricated, calibrated and otherwise serviced as required to assure proper performance. Equipment manufacturer service recommendations shall be followed where applicable. The preventive maintenance service interval (time-between-service activities) for each piece of equipment shall be that recommended by the equipment manufacturer in accordance with industry practice or six months, whichever is less. The cost to provide preventive maintenance during this period including parts, labor, travel, and subsistence, shall be included in the contract price. Prior to start of inservice use of each part of the Pressure Point, the CONTRACTOR shall provide to the OWNER a schedule for this maintenance service. All preventive maintenance activities

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- shall be documented with service reports which shall identify the equipment being serviced, state the condition of the equipment, describe all work performed, and list materials used. The report shall also include the name of the technician performing the work and his signature. A copy of all service reports shall be delivered to the OWNER on the day the work is performed.
- All preventive maintenance procedures shall be planned and accomplished in such a
  manner as to minimize disruption of water distribution system operation. No preventive
  maintenance procedure shall be allowed to jeopardize the OWNER's ability to monitor
  and control system operation.
- 3. At the OWNER's option, OWNER's maintenance personnel may participate in any preventive maintenance procedures.

#### C. Corrective Maintenance

- 1. The CONTRACTOR shall provide the services of factory-trained service technicians for the purpose of performing corrective maintenance on all system hardware. The period of coverage for each piece of equipment shall begin upon initial equipment purchase or manufacture and shall continue for two years after final acceptance or until expiration of the manufacturer's warranty, whichever period is longer.
- 2. The CONTRACTOR shall provide a 24-hour, 7-day/week service hotline for telephone notification of system malfunctions. Within 2 hours from notification by the OWNER of defective Pressure Point operation, the CONTRACTOR shall have a qualified service representative establish telephone contact with the OWNER's maintenance personnel to discuss short-term corrective measures. If it is not possible to correct the defective operation as a result of the telephone contact, the CONTRACTOR shall have a qualified service representative at the location of the installed Pressure Point within 24 hours from initial notification. The service representative shall perform all necessary inspections and diagnostic tests to determine the source of the defect and to establish a corrective action plan. The corrective action plan shall be developed such that the defect is corrected as quickly as possible and with the least impact on the operation of the OWNER's facilities. Prior to beginning any repair or replacement procedure, the CONTRACTOR shall review the corrective action plan with the OWNER in order to inform him of the planned course of action and to allow assessment of any impact that course of action might have on the operation of the OWNER's facilities. At OWNER's option, OWNER maintenance personnel may participate in any corrective maintenance procedures.
- 3. If possible, the service representative shall effect replacement or repair of the defective component before leaving the site using replacement parts from the spare parts inventory delivered with the system. Otherwise, the corrective action plan shall include a detailed schedule for the planned course of action. Once the defect has been corrected, the corrective action plan shall be updated indicating the source of the defect and specific corrective action taken. A copy of the updated corrective action plan shall be delivered to the OWNER on the day the work is performed. Any spares from the onsite supply of spares used by the CONTRACTOR in correcting the system malfunction shall be replaced within 15 days.
- 4. If 24-hour response time is not provided, or other corrective maintenance requirements are not met by the CONTRACTOR, the OWNER shall have the right to obtain corrective maintenance from other sources and charge the CONTRACTOR reasonable costs of the alternative maintenance services, including parts, labor, travel, and subsistence.
- 5. The OWNER, at OWNER's option, may elect to employ its own maintenance staff to locate and remove a defective component. In this case the OWNER will return the defective component to a repair location as instructed by the CONTRACTOR. The CONTRACTOR shall repair or replace the defective component and return the properly working unit to the OWNER within 15 days.

#### PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

#### A. Materials

- 1. Material shall be new, free from defects, and of the quality specified. All instruments with the same specification shall be from the same manufacturer.
- 2. Electronic equipment shall be solid-state construction, utilizing semi-conductors unless otherwise specified. Printed or etched circuit boards shall be glass epoxy of sufficient thickness to prevent warping and shall be hand or wave soldered. Alignment and adjustments shall be noncritical, stable with temperature changes or aging and accomplished with premium grade potentiometers. Components of standard electronic assemblies shall not be replaced with components of different characteristics in order to meet the performance requirements of this specification. Parts shall be as shown in the instruction manuals and shall be replaceable with standard commercial components of the same description without degrading the performance of the completed assembly.

#### B. Commonality

All equipment which serves common functions shall be common for all facilities. The RTU
system shall utilize the same type of processor for like functions throughout the system.
Where possible, the CONTRACTOR shall use the same processor family throughout,
unless specifically required elsewhere in the specifications.

## C. Maintainability

- Modular Design
  - a. All hardware shall be of modular design allowing easy replacement of power supplies, sub-assemblies, or cards. All modules shall be replaceable without dismantling functioning modules in order to reach the failed module.
- 2. Test Equipment Connections
  - a. Test equipment connections shall be accessible and well-marked. Test connections referenced in service manuals shall be labeled on the equipment with the same name or number.
- 3. Service Access
  - a. If the equipment is part of a line of multiple cabinets, service access shall be front and back only. Data acquisition equipment mounted in field locations shall require only front access.

#### PART 3 EXECUTION

## 3.1 SYSTEM TEST REQUIREMENTS

# A. General Requirements

- The Pressure Point RTU shall undergo a comprehensive system test process to demonstrate that the system performs as an integrated unit to meet the requirements of this specification. The CONTRACTOR, as a normal course of system development, shall conduct all element, subsystem, and system tests necessary to ensure the proper operation of the control system at various stages of system development. This type of testing will normally be unwitnessed; however, the OWNER reserves the right to witness these tests if concerns arise about the progress of system implementation.
- Two formal, witnessed tests shall be conducted on the Pressure Point:
  - a. Factory Demonstration Test
  - b. Field Testing (I/O Point Checkout)
- 3. The following paragraphs describe the requirements for each of these formal tests.

# B. Factory Demonstration Test

- 1. Description
  - a. A factory test and verification for all deliverable equipment, software, and associated documentation shall be performed prior to system, subsystem, or major components shipment. The equipment factory tests shall be performed to

# GENERAL CONTROL SYSTEM REQUIREMENTS SECTION 17000

verify that the equipment is manufactured and assembled correctly, is operating as designed, and is in compliance with the contractual requirements for the deliverables. The functional factory tests shall be performed to verify that the software and hardware will meet the functional and performance requirements of this document. The equipment shall be interconnected and subjected to system tests to simulate field conditions and operations.

- b. The Factory Demonstration Test (FDT) shall include the test and verification activities specified in this section.
- 2. System Configuration and Serialization Verification
  - a. Prior to beginning the factory Demonstration testing, the system/subsystem/elements shall be subjected to system deliverable configuration and serialization verification. A copy of the System Configuration Inventory List annotated to reflect this verification shall be included with the Factory Demonstration Test Report. No equipment replacement or substitutions shall be permitted without rigorous quality control accounting and retesting of affected equipment.
- 3. Equipment Test and Verification
  - a. Hardware Tests
    - The Factory Demonstration Test for the equipment (hardware) shall include individual end-item verification and integrated tests of all hardware. These tests shall include visual inspection verification and running the standard hardware diagnostic programs, plus all special diagnostic programs used by the CONTRACTOR to demonstrate that the hardware integration task has been completed.
    - 2) All hardware enclosures shall be verified to determine the structural integrity of each deliverable hardware end-item. As a minimum, the following shall be inspected and verified:
      - a) Cabinet enclosures
      - b) Frame structure
      - c) Paint work and finish
      - d) Dimensions.
  - b. Inspections
    - The following inspection checks shall be performed on all deliverable hardware end-items, as a minimum:
      - a) I/O Subsystem physical layout
      - b) Power supply mounting
      - c) Power cable routing
      - d) Data cable routing
      - e) Fans and blowers are unobstructed
      - f) Power conditioning correctly installed.
- 4. System Functional Test
  - a. Test Facets
    - 1) The functional test shall exercise every specified system function and shall include, but not be limited to, the following:
      - a) Rigorous exercising of all devices both individually and collectively.
      - b) Verification of proper Control Strategy up/down loading to the RTUs.
      - c) Demonstration of analog input and analog output accuracy.
      - d) Verification of all control operations to ensure that they result in the correct sequence of operation at all the RTUs.
      - e) Demonstration of all RTU diagnostics, both on-line and off-line.
      - f) Demonstrate the proper operation of all changes to the system negotiated and approved during the implementation period.
  - b. Test Thoroughness
    - The FDT shall demonstrate compliance to each explicitly stated requirement in the specification. CONTRACTOR shall use a personal

# GENERAL CONTROL SYSTEM REQUIREMENTS SECTION 17000

computer data base program such as Microsoft Access to build a FDT cross-reference table that lists each specification paragraph that imposes a uniquely identifiable technical requirement. CONTRACTOR shall add to the format a data field for the FDT test number of the test that is going to demonstrate compliance with the requirement. A second version of the table, sorted by test number, shall also be printed. This will make it possible to select any specification paragraph and identify the FDT test that should demonstrate the feature. The version ordered by test number can be used to verify the completeness of each test and shall be used during the FDT to check off the features demonstrated.

- 5. FDT System Configuration
  - a. The CONTRACTOR shall stage in his facilities as many of the control system components as practical for use in an integrated Factory Demonstration Test. The specific components in the system configuration to be used for FDT shall include all RTU's.
- 6. Simulation Software
  - The CONTRACTOR shall provide simulation and monitoring software utilizing the MAS radio to poll the RTU's to demonstrate data gathering capability.

## C. I/O Point Checkout

- I. The CONTRACTOR shall perform a complete, end-to-end checkout of every I/O point. I/O Point Checkout shall be witnessed by the OWNER or OWNER's Representative and shall be conducted on an RTU-by-RTU basis. After the CONTRACTOR has completed installation of an RTU (including all associated instrument calibration), the OWNER will install the basic RTU monitoring program in the RTU. The CONTRACTOR shall verify communications with the SCADA system and shall test every input and output point for proper operation. Test signals shall be injected to verify the operation of each Analog Input (AI), and Discrete Input (DI) point. Each Discrete Output (DO) shall be also tested for proper operation. End-to-end testing shall use the SCADA process graphic displays to verify proper operation of the I/O points all the way to the WDCS Operator Workstation control console.
- 2. The CONTRACTOR shall develop a complete I/O Point Checkout Test Procedure. The test procedure shall identify the method to be used by the CONTRACTOR for injecting test signals for each input point type and the method to be used for verifying the appropriate output signals for each output point type.
- 3. The CONTRACTOR shall develop a point checkout form for each I/O point. The point checkout form shall include the point ID, description, all checks performed for the point, date and time of the check, and a signoff block for both the Supplier's representative and the OWNER's representative. For each item checked, the form shall include both the expected value/result and the actual value/result witnessed.
- 4. The following items shall be checked for each I/O point:
  - For each analog input point, the following values shall be checked:
    - 1) Value at 0% of full scale (ramped in both directions)
    - 2) Value at 25% of full scale (ramped in both directions)
    - 3) Value at 50% of full scale (ramped in both directions)
    - 4) Value at 75% of full scale (ramped in both directions)
    - 5) Value at 100% of full scale (ramped in both directions)
    - 6) HiHi Alarm Limit (if entered in data base)
    - 7) High Alarm Limit
    - 8) Low Alarm Limit
    - 9) LoLo Alarm Limit (if entered in data base)
    - 10) Alarm Deadband
  - b. For each analog output point, the following values shall be checked:
    - 1) Milliamp reading at 0% of full scale (ramped in both directions)
    - 2) Value at 25% of full scale (ramped in both directions)

# GENERAL CONTROL SYSTEM REQUIREMENTS SECTION 17000

- 3) Milliamp reading at 50% of full scale (ramped in both directions)
- 4) Value at 75% of full scale (ramped in both directions)
- 5) Milliamp reading at 100% of full scale (ramped in both directions)
- c. For each discrete input point, the following items shall be checked:
  - 1) For status points, proper indication
  - 2) For alarm points, proper alarm notification
- d. For each discrete output point, the following items shall be checked:
  - 1) Proper operation
  - 2) Actuation time-out alarm (if value is entered in data base)
- 5. The completed I/O Checkout forms for all points shall be included as part of the I/O Checkout Test Report to be prepared and submitted at the conclusion of all I/O checkout activities.

#### 3.2 EQUIPMENT FABRICATION AND ASSEMBLY

## A. Cabinet Requirements

- Cabinet Construction
  - a. All equipment shall be enclosed in a cabinet approved by the original equipment manufacturer. Each cabinet shall be provided with a ground lug.
- 2. Mounting Requirements
  - a. All equipment cabinets, consoles, etc. shall provide for mounting to the floor.
  - b. The CONTRACTOR shall submit fabrication details and calculations showing the recommended methods for anchoring and supporting the equipment. The details and calculations shall show that the equipment, support, and anchorage, when installed as recommended, will withstand stresses caused by an earthquake as specified.
- 3. Conduit Entry
  - a. Normal conduit entry shall be through the bottom of the RTU, unless otherwise shown on the drawings. No holes or other penetrations shall be allowed through the sides of the cabinets.
- 4. Cabinet Temperature Control
  - a. All cabinets shall have ample cooling to prevent high temperatures from shortening the life of the equipment. No location within the cabinet or interior of the equipment mounted inside shall reach temperatures higher than that specified for the equipment by the equipment manufacturer.

## B. Wiring Practices

- Cable Runs
  - a. All cables and wiring shall be run in a manner which protects the cable from damage or electrical noise.
  - b. Cables or wires shall not be supported by their connections or terminations.
  - c. Cables or wiring shall not run across hinges of doors or panels at 90 degree angles to the hinge.
  - d. All cables and wires shall be protected from abrasion, multiple flexing at any one spot and accidental snagging during maintenance.
  - e. Ribbon cables shall not be suspended by the connection and shall be protected from noise and cross-talk.
  - f. All connectors shall be keyed and allow the connection to fit only one way.
- Labeling
  - a. All cables and connectors shall be labeled as specified. Any connector on a cable end and the receptacle that the cable fits into shall be labeled in a way which clearly identifies the proper cable and receptacle connection.
- 3. Cable Terminations
  - a. All cable and wire terminations shall be through industry standard connectors which allow proper termination of ground shield wires to the designated ground.

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Shield wires shall be terminated at one end only to prevent groundloops.

#### 3.3 INSTALLATION AND STARTUP

## A. System Startup Plan

 The CONTRACTOR shall develop a specific plan for the installation and startup of the new RTU. No startup or cut-over activities shall be performed until the plan has been Successfully Reviewed.

# B. Field Testing

1. Field testing shall consist of a sequence of activities and tests conducted as the control system components are installed and integrated at the job site. Following is a description of the individual steps that are involved with field testing and cut-over.

#### 2. RTU Checkout

- The overall process of RTU checkout shall entail installing and testing the RTUs one site at a time. Following is a discussion of the series of steps involved with the checkout of the RTUs.
  - After the RTU has been installed, the OWNER shall verify communications via the MAS remote radio, utilizing the radio system diagnostics and monitoring software.
  - Next, the CONTRACTOR/OWNER/OWNER'S REPRESENTATIVE shall perform an end-to-end (Operator Workstation to field termination) check of every physical I/O point connected to the RTU.
  - During the RTU installation and checkout phase, the CONTRACTOR shall provide a minimum of 2 people on site full-time. OWNER will provide one person full-time in the control room (dedicated to testing activities), and one to two persons in the field to support installation and testing activities. One OWNER field person will observe the CONTRACTOR's work associated with startup of the new RTUs. The second OWNER field individual will assist with end-to-end and control software tests. OWNER will provide testing support as required.

### 3.4 SYSTEM APPLICATION CONFIGURATION

### A. Data Base Development

1. The scope of defining and updating the SCADA system databases for the RTU Expansion will be performed by the OWNER'S REPRESENTATIVE.

#### B. Graphic Display Development and Modification

1. The scope of modifying or designing and building the graphic displays for the WDCS SCADA System will be performed by the OWNER'S REPRESENTATIVE.

#### C. RTU Programming Development

The OWNER'S REPRESENTATIVE will develop a basic RTU program which will provide for remote monitoring of the RTU and its associated instrumentation from the SCADA system. This basic RTU program will be utilized during Factory Demonstration Testing and Field Testing.

## 3.5 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

- 1) D. Widner
- 2) R. Copeland

## PART 1 GENERAL

#### 1.1 SUMMARY OF REQUIREMENTS

- A. This section specifies the requirements for the MAS Radio equipment and services which shall be provided by the CONTRACTOR to support Water Distribution Control System (WDCS) communications. The equipment consists of:
  - 1. MAS remote radios at RTU remote site.
  - 2. Coaxial cable at RTU remote site (as shown on the Drawings).
  - 3. MAS radio antennas and associated mounting equipment at each RTU remote site (as shown on the Drawings).
- B. This equipment shall operate in the 928-952 MHz MAS frequency band or the 932-941 MHz MAS Frequency Band, as specified, and shall provide the data rate of 9600 bits per second (bps) from each Master Station Radio location to each Remote Radio location.

#### 1.2 WORK INCLUDED

- A. The Work consists of furnishing all labor, services, materials, tools, equipment, software and necessary other items to implement the MAS Radio subsystem as described herein. This will include, but not be limited to, the Work to provide the following major elements:
  - 1. MAS Remote Radios at each RTU site (unless otherwise designated).
  - 2. Coaxial cable work for remote sites as designated on the drawings.
  - 3. Installation of MAS radio antennas at remote sites as designated on the drawings.
  - On-site end-to-end performance tests of the completed MAS Radio subsystem to include all remote RTU radios installed under this contract.

#### 1.3 TERMINOLOGY

Refer to Section 17000.

## 1.4 RELATED WORK

Work required herein must be coordinated with the other work to be performed in this contract.

#### 1.5 QUALITY ASSURANCE

#### A. General

- 1. It is the intent of these Specifications and of the Contract Drawings to establish quality standards of all equipment and materials and to require first class workmanship.
- 2. All equipment and materials shall be new and of the highest quality.
- 3. All work shall be accomplished by qualified, experienced personnel working under continuous and competent supervision.

#### B. Reference Standards

 This section references the latest revisions of the following standards. These shall govern, as applicable, the electrical terminology, the design, the materials, the construction and the testing methods for the equipment specified in this Section. In case of conflict between the requirements of this Section and those of the listed standards, the requirements of this Section shall prevail.

<u>Standard</u>	<u>Title</u>
ANSI/IEEE Std. 100	IEEE Standard, Dictionary of General and Electronic Terms.
EIA-RS-210-C	Racks, Panels and Associated Equipment.

EIA-RS-232-D Compatible Interface Between Data Terminal

**Equipment and Communication Equipment** 

Employing Serial Binary Interchange.

EIA/TIA-222-E Structural Standards for Steel

Antenna Towers and Antenna Supporting

Structures.

EIA/TIA-568 Performance Standards for Data

Communication Wiring Systems.

ISO 2110 Data Communication 25-pin DTE/DCE

Interface Connector and Pin Assignments.

FCC Rules Part 2

Part 15 Specifically Subpart J, Class B

Radiation Limits.

Part 17 Construction, Marking and Lighting of

Antenna Mounting Structures.
Part 94 All applicable sections

Bellcore TR-NWT-000499 Transport System Generic Requirements:

Common Requirements.

Bellcore TR-TSY-000752 Microwave Digital Radio Systems Criteria.

Bellcore TR-NWT-000332 Reliability Prediction Procedure for Electronic

Equipment.

Bellcore GR-1089-CORE

ANSI C63.4

Electromagnetic Compatibility and Safety. Methods of Measurement of Radio Noise

Emission.

ANSI C63.12 Recommended Practice for Electromagnetic

Compatibility Limits.

CCITT Specifications Committee Consultatif International Telegraph

and Telephone - All applicable sections.

## C. Codes and Regulations

1. This section references the following codes. Apparent conflicts between the contract documents and the listed codes shall be submitted to the OWNER for resolution, prior to ordering materials or performing affected work.

<u>Code</u> <u>Title</u>

NEC National Electric Code (NFPA 70)

NESC National Electrical Safety Code

UBC Uniform Building Code

# D. Underwriters Laboratories, Incorporated

 Unless otherwise specified, electrical equipment and material provided under this contract shall be listed and labeled for the purpose for which it is used by the Underwriters Laboratories, Incorporated (UL). This requirement may be waived only if a UL listing is not available for the type of product.

## E. Measuring Equipment and Tools

 Validity of measurements and tests shall be ensured through the use of suitable inspection, measuring and test equipment of the range and type necessary to determine conformance of items with the Contract requirements. Measuring devices shall be verified or calibrated against certified standards that have a known traceable relationship to the National Institute of Standards and Technology. Every device so verified or calibrated shall bear an indication attesting to the current status and showing the date on which inspection or re-calibration is next required. Any tests run with instruments not in compliance with the requirements if this paragraph shall be considered invalid.

#### 1.6 SUBMITTALS

#### A. General

1. The CONTRACTOR shall provide submittals as specified. Each submittal shall be complete, with all required information provided together at one time, and submitted in a sequence that allows the OWNER to have all of the information necessary for checking and approving a particular document at the time of the submittal. The CONTRACTOR shall be responsible for planning and making all submittals as necessary to avoid delays or conflicts in the work.

## B. Test Plan and Procedures

 CONTRACTOR shall develop a comprehensive RTU communication test plan and procedures as specified.

## C. Operation and Maintenance Manuals

1. The CONTRACTOR shall include in the Operation and Maintenance Manuals all equipment supplied, installed and tested as specified in Section 17320. The submittal shall conform to the specification requirements.

## 1.7 ENVIRONMENTAL SPECIFICATIONS

A. All equipment shall function properly and meet all specifications under the following environmental conditions.

## B. Equipment Location

1. Remote radios will be mounted in NEMA 3R enclosures installed at outside locations.

# C. Temperature

1. The equipment shall meet the following temperature requirements:

a. Full performance
 b. Operational
 c. Storage
 -22 degrees F to +140 degrees F
 -40 degrees F to +158 degrees F
 -58 degrees F to +167 degrees F

## D. Humidity

1. Equipment shall operate without degradation to performance over the relative humidity range from 0% to 95%, non-condensing.

## E. Elevation

1. The equipment may be located at an altitude of up to 3,000 feet above sea level and shall survive shipment via air transport methods without damage in any way wherein the effective altitude may be up to 15,000 feet above sealevel.

# F. Seismic Forces

1. The equipment shall withstand without damage, seismic or other forces of equal magnitude to those specified in the Uniform Building Code for the State of Texas for the Austin area.

# G. Thermal Shock

1. Equipment shall comply with the thermal shock test requirements established in Bellcore Technical Advisory TR-TSY-000752, Section 17.

# H. Electromagnetic Interference and Susceptibility

- 1. Shielding and filtering shall be provided to prevent Radio Frequency Interference (RFI) from, or to, other radio frequency equipment installed near, or in the vicinity of the proposed equipment.
- 2. Interference to Other Equipment
  - a. Equipment supplied by CONTRACTOR shall not interfere with the following types of

equipment (operating within specifications) located in the same shelter.

- 1) Analog and Digital Microwave Equipment
- 2) FM Translator Equipment
- 3) TV Translator Equipment
- 4) Low-Power FM & TV Transmitters
- 5) VHF/UHF Mobile Base Stations
- 6) VHF/UHF Hand-Held/Cellular Radios (limited to 5-watts at antenna port)
- b. Such interference shall cause a maximum of 0.5dB degradation to such other equipment where indication of interference shall be evaluated and considered on a case-by-case basis with the OWNER.

# 3. Interference Susceptibility

- Equipment supplied by the CONTRACTOR shall be operationally compatible with the following types of equipment (operating within specifications) located in the general vicinity of:
  - 1) High Power FM & TV Transmitters (antennas co-located on tower)
  - 2) VHF/UHF Vehicular Mobile/Cellular Radios (3 meters or greater)

## 4. RFI Emission Mitigation

 a. Interference to physically adjacent and/or adjacent in frequency band equipment caused by radio frequency emission from equipment shall be mitigated at CONTRACTOR expense.

## 5. RFI Susceptibility Mitigation

- a. The radio transmitter and receiver equipment that are part of this MAS Radio subsystem, located as specified, shall not cause measurable performance degradation to other nearby radio equipment.
- b. Corrective measures to eliminate interference from external equipment shall be made at The CONTRACTOR's expense. The interference susceptibility of equipment shall be mitigated to less than 1 dB degradation of the BER threshold. The CONTRACTOR will be given a list of all equipment that is now in place at each of the equipment rooms.
- 6. Use of Shielded and Grounded Cables
  - Shielded and grounded coaxial and twisted-pair cable for inter-shelf wiring of equipment shall be used, unless otherwise noted.

#### I. Power

- 1. Remote site radios shall be powered from a 24 volts direct current (VDC) power system supplied with each RTU, unless otherwise shown on the Drawings.
- Equipment shall meet all specifications in the presence of externally-produced battery ripple not exceeding 200 mV RMS, with voltage spikes up to 60 volts peak-to-peak, 125 microseconds rise time. Equipment shall meet the requirements for bus noise as presented in Bellcore Technical Advisory TR-TSY-000752, Section 14.3.
- Each MAS Radio assembly shall not contribute more than 25 mV RMS of ripple to the DC plant, assuming a 400-amp hour (AH) battery system. Equipment shall meet the requirements for Noise Allocation (bus loading) as presented in Bellcore Technical Advisory TR-TSY-000752, Section 14.4.

#### 1.8 SITE LOCATIONS

 A. The Work for the MAS Radio Subsystem includes the <u>Springdale/290</u> Pressure Point site (PP-31).

#### B. Existing Master Station Sites

1. South Service Center - 3616 South 1st St., Austin, TX

a. Lat. 30-13-52 Nb. Long. 97-46-08 W

c. Elev. 662 ft. AMSL at ground elevation

2. Martin Hill - Williamson 1/2-mile West of Rd. 1325, Austin, TX

a. Lat. 30-27-30 Nb. Long. 97-42-05 W

c. Elev. 931 ft. AMSL at ground elevation

3. Davis Hill - 3402 Davis Lane, Austin, TX

a. Lat. 30-11-39 Nb. Long. 97-50-22 W

c. Elev. 864 ft. AMSL at ground elevation

4. Four Points - 10507 FM 2222, Austin, TX

a. Lat. 30-23-25 Nb. Long. 97-50-37 W

c. Elev. 1087 ft. AMSL at ground elevation 5. Mount Larson - 1200 Mt. Larson Rd., Austin, TX

a. Lat. 30-18-33 Nb. Long. 97-47-35 W

c. Elev. 900 ft. AMSL at ground elevation 6. Harold Court – 6301 Harold Court, Austin, TX

a. Lat. 30-16-1.2 N (NAD-83)

b. Long. 97-40-25.3 W

c. Elev. 540 ft. AMSL at ground elevation

#### C. Remote Station Sites

The latitude and longitude of the new MAS Remote Station site can be provided by OWNER.
 The OWNER will furnish maps showing the street locations upon request.

## PART 2 PRODUCTS

#### 2.1 GENERAL

A. Material shall be new, free from defects, and of the quality specified. Electronic equipment shall be solid-state construction, utilizing semiconductors unless otherwise specified. Printed or etched circuit boards shall be glass epoxy of sufficient thickness to prevent warping. Alignments and adjustments shall be noncritical and stable with temperature changes or aging. Components of standard electronic assemblies shall not be replaced with components of different characteristics in order to meet the performance requirements of this specification. Parts shall be as shown in the Operations and Maintenance Manuals and shall be replaceable with standard commercial components of the same description without degrading the performance of the completed assembly.

## 2.2 MAS REMOTE STATION RADIOS

## A. General Requirements

- Each CONTRACTOR Provided Remote Station Radio shall support 928-952 MHz and 932-941 MHz point-to-multipoint digital communications links between Master locations and Remote locations by means of the multiple address system (MAS) technology.
- 2. Each Remote Station radio unit shall have FCC authorization or notification of type acceptance under FCC rules Part 94 for operation in a 12.5 KHz bandwidth including 9600 bps operation.
- Each Master Station radio and its Remote Station radio units shall operate on a unique transmit/receive frequency pair and on a non-interfering basis with the other Master/Remote sections of this subsystem.
- 4. Each MAS Remote Station Radio shall operate on nominal 24 volts DC power and within all specifications within the range of 10 to 30 volts DC.
- 5. The MAS Remote Station radio shall include an Automatic Frequency Control (AFC) circuit to automatically adjust the remote radio frequency to match the frequency transmitted by the Master station radio.
- The MAS Remote Station radio shall have a loopback decoder that operates in conjunction with the Master Station's microprocessor to provide signal strength, frequency error, and FM deviation levels.
- 7. Remote Station Radios shall be compatible with Existing and OWNER Provided Master Station Radios, and shall be GE MDS SD9 Series to match existing.

# B. Physical Requirements

1. The following general physical requirements (in addition to the temperature and humidity

requirements as listed earlier) shall be met.

- a. Mounting
  - 1) All components of the Remote Station radio shall be mounted in a single cast aluminum housing. Modular construction shall be used throughout.
- b. Maintainability
  - All routine adjustments shall be made using a personal computer web browser that connects via a standard CAT5 cable interface.
- c. Antenna Port
  - 1) The coaxial antenna port shall be TNC female.

# C. Performance Requirements

- 1. Performance requirements for the Remote Station Radio equipment are as follows:
- 2. Operational Mode Supported
  - The Remote Station radio shall operate in half-duplex mode with the transmitter keying provided by the associated RTU.
- Indicators
  - a. The face of the transceiver shall be equipped with individual LED indicators showing primary power on, receive carrier detect, out-of-lock alarm, transmit keyline activity and transmit status.
- 4. Transmitter Section Requirements
  - The following are the transmitter requirements that shall be met by each Remote Station radio:
    - 1) Output Power (at the antenna port): 5 Watts (+37 dBm) maximum, adjustable from +20 to +37 dBm.
    - 2) Duty Cycle: 100 % continuous at 5 watts over the temperature range -22 degrees F to +140 degrees F.
    - Transmitter Attack Time: Less than 1 millisecond for 90% power within 1 KHz of operating frequency.
    - 4) Output Frequency: Programmable in the range of 800 to 960 MHz, 6.25 KHz Increments.
    - 5) Frequency Stability: Plus or minus 0.00015% from -22 degrees F to +140 degrees F.
    - 6) Modulation Type: Frequency Modulation with MFSK or BFSK format.
    - 7) Spurious and Harmonic Emissions: -60 dB relative to output power level.
    - 8) Output Impedance: 50 Ohms
    - 9) Modulation Deviation: Plus or minus 2.5 KHz (for 12.5 KHz channels) or as required by the modulation format and the FCC defined (in the Part 94 rules) bandpass envelope.
    - 10) Time-out Timer: Internally programmable from 2 to 255 seconds.
- 5. Receiver Section Requirements
  - The following are the receiver requirements that shall be met by each Remote Station radio:
    - 1) Type: Dual conversion superheterodyne.
    - 2) Sensitivity / Bit Error Rate (BER) (at antenna input port): -107 dBm with a 9600 bps Bit Error Rate of 1x10<sup>-6</sup>.
    - 3) Frequency Stability: Plus or minus 0.00015% from -22 degrees F to +140 degrees F.
    - 4) Input Frequency: Programmable in the range of 800 to 960 MHz, 6.25 KHz Increments.
    - 5) Spurious Level: 85 dB or more below transmitter output power.
    - 6) Image Rejection: 85 dB minimum.
    - 7) Selectivity: -100 dB minimum at adjacent channel band edge.
    - 8) RF Input Impedance: 50 Ohms.
    - 9) Intermodulation (EIA): -75 dB minimum.
    - 10) Desensitization (EIA): -60 dB minimum, 12.5 KHz channels.
- 6. Diagnostic, Control and Monitor Software at Remote Stations
  - a. Each Remote Station radio shall include the following remote programmability functions using either the diagnostics workstation or handheld terminal furnished by the OWNER.
  - b. Frequency Control

- The Remote Station radio shall incorporate a frequency synthesizer that is remotely programmable to all of the FCC Part 94 900 MHz MAS frequencies via the diagnostics workstation or handheld terminal furnished by the OWNER.
- c. Radio Parameters Control
  - 1) The following Radio Parameters shall be programmable or monitored via the diagnostics workstation or handheld terminal furnished by the OWNER.
    - a) Transmit and receive frequencies
    - b) Time-out Timer setting
    - c) Soft carrier dekey setting
    - d) Loopback code
    - e) Hardware/software revision level
    - f) Date of manufacture
    - g) Serial number and model number
- d. Radio Diagnostics Monitoring
  - 1) The following Radio Diagnostics shall be remotely monitored:
    - a) Received signal strength
    - b) Transmit power.
    - c) Regulator voltage
    - d) Power supply voltage
    - e) Phase lock loop voltage.

#### 2.3 MAS REMOTE ANTENNAS

#### A. General

 Remote Station Yagi antennas shall be suitable for operation in the multiple address system (MAS) 928-952 MHz and 932-941 MHz frequency band. Elements shall be fabricated of 6061/T6 aluminum rod and seamless drawn pipe, anodized for corrosion resistance. Hardware and fastenings shall be stainless steel. The internal balun, coax feed and connector shall be foam-sealed to prevent moisture penetration.

## B. Performance Requirements

1. Remote Station yagi antennas shall meet the following requirements:

Frequency Range: 890 to 960 MHz

Antenna Gain: 10 dBd

Maximum Power Input: 100 Watts (at 50 deg. C.)

Front-to-Back Ratio: 20 dB minimum

Polarization: Vertical

H-plane Beamwidth: 48 degrees (half-power)

E-plane Beamwidth: 40 degrees (half-power)

Impedance: 50 ohms

VSWR Less than 1.5 to 1

Lightning Protection: Direct ground protection to tower or mast

Wind Survival Rating: 150 mph

Connector: Type N female

Mounting Hardware: Weatherproof clamps suitable for direct mount to 2 inch

diameter steel pipe.

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#### C. Manufacturer

1. Remote Station yagi antennas shall be Kathrein-Scala Model TY-900, or approved equal.

#### 2.4 RF TRANSMISSION CABLES AND CONNECTORS

A. Coaxial cables for the Remote Station Radios shall be of weatherproof quality and, for Remote Station sites, with a net loss of less than 2.5dB from the radio set to the antenna connector. Cable for short runs (less than 25 feet) can be of standard Type RG8/U. Longer runs shall be coaxial cable with a copper outer conductor and a low-loss foam dielectric between the inner and outer conductors. All coaxial cable shall have an impedance of 50 ohms.

#### B. Remote Station RF Transmission Cable

- Remote Station RF transmission cable shall be 1/2" for runs less than 75 feet or 7/8" for runs more than 75 feet, Times Microwave type LMR600-DB or LMR900-DB as required, or approved equal.
- Type RG8/U cable shall have tinned copper braid 100% shield coverage, an overall black PVC jacket and a nominal attenuation of 4.2 dB/100 ft. at 900 MHz, Belden No. 9913, or approved equal.

## C. Coaxial Jumper Cables

1. Coaxial jumper cables shall be RG214/U coaxial cables with factory installed and tested Type N connectors manufactured in compliance with Military Specification MIL-C-17G.

#### D. Coaxial Cable Connectors

 Coaxial cable connectors shall be Type N. All connectors and flanges will be installed properly utilizing manufacturer's supplied gaskets, sealant compound and alignment techniques to minimize mismatch and pressure leakage. All connections will be pressure tight.

## 2.5 COAXIAL CABLE LIGHTNING SUPPRESSORS

A. Lightning suppressors shall be furnished for all coaxial cable terminating at all antennas except RTU panel mounted antennas. Lightning surge suppressors shall be designed to allow less than 220 microjoules of throughput energy during an impulse event. Suppressors shall be direct current blocked, have 50 ohms impedance and have a VSWR of 1.1 or less over a frequency range up to 1000 MHz Suppressors shall be bulkhead or surface mounted as required at each site with Type N female connectors. Lightning surge suppressors shall be Polyphaser Model IS- 50NX-C2, or approved equal.

#### PART 3 EXECUTION

# 3.1 GENERAL

A. All Work shall be performed in accordance with the provisions of this section and Section 17000.

# 3.2 PRODUCT HANDLING

# A. Preparation For Delivery

- 1. Packaging
  - a. All final assemblies shall be wrapped in protective material so as to provide adequate protection during shipment.
- 2. Marking
  - a. All equipment shall be appropriately marked regarding function, handling and storage.

#### B. Shipping

 All equipment shall be shipped in a manner to assure timely delivery and protection of materials. Any equipment damaged during shipping or delivery shall be rejected and repaired or replaced by the CONTRACTOR, at the OWNER's discretion, at no cost to the OWNER.

# 3.3 ANTENNA MOUNTING, INSTALLATION AND ALIGNMENT

#### A. Installer Qualifications

- 1. The CONTRACTOR shall exclusively use MAS radio equipment installers who meet the following requirements:
  - a. At least one (1) lead technician with a General Class FCC commercial license
  - b. Installers must possess a NARTE or equivalent certification.

#### B. Antennas

 The CONTRACTOR shall install antenna support equipment and structures and MAS remote site antenna in accordance with the Contract Drawings. Antennas shall be aligned at each remote site such that maximum signal strength is received from the corresponding Master Station to which the remote site will communicate. Coordinate with OWNER for site specific requirements.

#### C. Coaxial Cable and Connectors

- Coaxial cables shall be installed in accordance with the manufacturers recommended practices
  and supporting tools without kinks or dents. The bending radius shall not exceed the
  manufacturer's recommended radius. Connections shall be made of Type "N" connectors
  approved by the cable manufacturer.
- Manufacturer approved clamps and supports shall be used to relieve stress on the coaxial cables and connectors. The installation of fittings, clamps and connectors shall be performed using tools and procedures conforming to the manufacturer's recommendations.
- 3. The attenuation shall be less than the length of the waveguide times its measured attenuation coefficient plus 1.0 dB allowance for connector losses (to include effects of VSWR).

# D. Coaxial Cable Grounding

1. The top (within 3 feet of the antenna) of the vertical run of the coax should be grounded by using approved grounding kits which have low impedance conductors. Grounding kits should not be placed in a bend of coax. In addition, where applicable, the coax should be grounded at a point where it enters the building using 2-hole #2 American Wire Gauge (AWG) crimp connectors and stainless steel bolts and nuts.

### E. Coaxial Cable Runs

All transmission lines will be continuous from connector to connector with a minimum number
of bends and no splices. Runs will be sufficiently long to avoid the use of flexible coax sections
exceeding three (3) feet at the equipment end. No flexible coax sections will be used at the
antenna end. A drip loop will be made in the coax run at the radio building or shelter entrance.

# 3.4 TESTS

# A. General

1. The CONTRACTOR shall test the complete MAS Radio Subsystem in accordance with the tests and performance requirements as specified.

#### B. Standalone Tests

 The CONTRACTOR shall test each MAS remote radio to demonstrate compliance with Section 17320-2.02 and compliance with FCC regulations governing MAS radios. CONTRACTOR shall measure and record the standard test points indicated in manufacturer's standard startup, periodic and maintenance test procedures.

#### C. Communications End-to-End Tests and Demonstration

The CONTRACTOR shall test two-way radio communications to each remote site. The end-to-end test shall demonstrate no loss of throughput and a high quality performance meeting or exceeding the performance requirements defined in Paragraphs 2.02 in this Section 17320 of the Specification. At a minimum the CONTRACTOR shall demonstrate that each remote site-to-master station link has a maximum BER of 1 x 10<sup>-6</sup> and a minimum fade margin of 28 dB in

- both directions of communication.
- 2. The CONTRACTOR shall measure and record the radio frequency receive signal level (RSL) at each remote and master station radio site for both directions of communication.
- 3. Order wire voice communications shall be demonstrated between each Master and Remote Station radio link.
- For each link the CONTRACTOR shall submit a test certificate stating that the link meets or exceeds the requirements of this paragraph. Each test certificate shall be signed by the CONTRACTOR.

## D. Communications Quality Demonstration

 Link margins, bit error rate, availability and reliability shall each be confirmed by controlled tests in accordance with the standards defined in Paragraph 1.05(B) of this Section 17320 of the Specification.

# E. Communications Cabling Tests

 The CONTRACTOR shall test end-to-end each communications cable that is furnished by the CONTRACTOR. Testing shall be performed after field connectors have been installed. The testing shall include testing for continuity, opens, shorts and split pairs.

#### F. Coaxial Cable Tests

1. The CONTRACTOR shall test end-to-end each coaxial cable that is furnished. Tests shall be performed after each cable has been connectorized and connected to the antenna. The voltage standing wave ratio (VSWR) and attenuation shall be measured for each cable. The equivalent measured return loss of each antenna/cable system shall be 20 dB or greater. The attenuation shall be less than the total length of the coaxial cable times its published attenuation coefficient plus 1.0 dB for all connector losses. CONTRACTOR shall remedy, repair or replace the antenna system at his cost if the return loss and attenuation objectives are not met.

## 3.5 SYSTEM WARRANTY AND SPARE PARTS REQUIREMENTS

- A. Warranty Refer to Section 17000.
- B. Spare Parts Requirements Refer to Section 17000.

#### 3.6 SYSTEM MAINTENANCE REQUIREMENTS

A. Refer to Section 17000.

## 3.7 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

### **END OF SECTION**

- 1) D. Widner
- 2) R. Copeland

# PART 1 GENERAL

# 1.1 SUMMARY OF REQUIREMENTS

# A. Scope

- 1. The CONTRACTOR shall furnish, deliver, and install the enclosure and all equipment shown on the drawings and as specified.
- 2. This section specifies connection wiring within panel and electrical accessories such as switches, relays, terminal blocks, and fuses which are included in the panel.
- 3. All work and products shall conform to the designs shown on the applicable Drawings, and shall comply with the provisions of this section. The control panel shall be factory wired. Panels and enclosures shall include all components indicated in the applicable Drawings, required to provide functions as specified in this section. Where specific requirements on the Drawings conflict with general design requirements in this section, the requirements shown on the Drawings shall prevail.

# B. Required Panels

Panels shall conform to the layout shown on the Drawings, and be sized to
accommodate the initial and future Input/Output (I/O) modules shown on the
drawings. Enclosure sizing was based on typical industry-standard equipment.
CONTRACTOR shall advise the OWNER if a larger enclosure is required to meet
these PO counts using the actual equipment to be supplied by the
CONTRACTOR.

## C. Quality Assurance

1. All equipment and accessories provided shall be the product of a manufacturer regularly engaged in manufacturing of this equipment whose products have been in satisfactory service for not less than three (3) years.

## D. Panel Component Layout

1. The CONTRACTOR shall generally follow the arrangements of components shown on the Contract Drawings, however, the CONTRACTOR shall make adjustments as necessary to allow each component to be mounted as recommended by the manufacturer, to facilitate easy installation, removal and in-place maintenance of each component, and to allow normal operation of the component by operating and maintenance personnel. Component arrangements shall allow space for routing of wiring without kinking or bending around sharp edges, and for free flow of air around and through equipment which requires ventilation for cooling.

## 1.2 REFERENCE STANDARDS

A. In addition to the requirements of Specification Section 17000, all materials and workmanship shall conform to the latest published applicable provisions of the following codes and standards:

<u>Title</u>
National Electrical Code (NEC)
General Standards for Industrial Controls and Systems
Industrial Control Devices, Controllers, and Assemblies
Industrial Systems
Terminal Blocks for Industrial Control Equipment and
Systems
Enclosures for Industrial Controls and Systems
Enclosures for Electrical Equipment (1000 Volts maximum)
Racks, Panels, and Associated Equipment
Low-Voltage AC Power Circuit Breaker (600 Volt Insulation
Class)
Electrical Isolation for Analog Signal Devices C39.5

B. Unless otherwise specified, electrical equipment and material provided under this contract shall be listed and labeled for the purpose for which it is used by the Underwriters Laboratories, Inc. (UL). This requirement may be waived only if a UL listing is not available for the type of product.

#### 1.3 SUBMITTALS

#### A. General

The CONTRACTOR shall provide submittals as defined herein and as specified.
The CONTRACTOR shall submit drawings and literature describing equipment
for OWNER's approval, in accordance with Specification Section 01300.
Submittals shall be required for all equipment supplied. For each panel, the
CONTRACTOR shall submit a certified factory (shop) test report before panel is
shipped.

#### B. Connection Diagrams

- 1. Connection diagrams shall show the placement, labeling and wiring of components within panels and cabinets. Components shall be shown arranged in the physical layout (not necessarily to scale) as it would appear to a person servicing the equipment. Wires shall be shown as a continuous line between their termination points. The direction of entry to a wire bundle shall be shown. Wire lists and wireless diagrams shall not be accepted. All additions and deletions of devices and wires in existing enclosures shall be clearly shown. Each wire label designation shall be shown. The wire label designations on each end of a single wire must be identical. All wire termination point numbers shall be shown. Each wire color shall be shown. Signal and DC circuit polarities shall be shown. All jumper, shielding and grounding details shall be shown. Wire pairs shall be shown. Spare wires and termination points shall be shown.
- 2. The CONTRACTOR shall submit connection diagrams for all panels. Connection diagrams shall be submitted for review and returned marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" prior to the start of panel assembly. Loop diagrams may not be substituted for connection diagrams.

#### PART 2 PRODUCTS

#### 2.1 ENCLOSURE

- A. Type: NEMA 3R, Painted Steel for outdoor locations. See Drawings for details.
- B. Mounting: Floor mounted with provisions for bolting to concrete pad as shown on the Drawings.
- C. Dimensions: 36" W X 48" T X 16" D with 12" mounting feet for a total height of 60"T.
- D. Contain all necessary parts for a complete system with expansion space to accommodate future SCADA system needs, as shown on the Drawings and specified herein.

## 2.2 ENCLOSURE / PANEL FABRICATION

#### A. Materials

1. Panels for use outdoor environment shall use NEMA 3R painted steel enclosures suitable for pad mounting. Each shall be provided with a full-length interior rear panel. Adjustable mounting shall be provided on both vertical sides to rails located at the top, bottom, and middle of the enclosure. All enclosures shall be Ace Manufacturing, Hoffman Engineering Company, Rittal, or approved equal.

## B. Coating

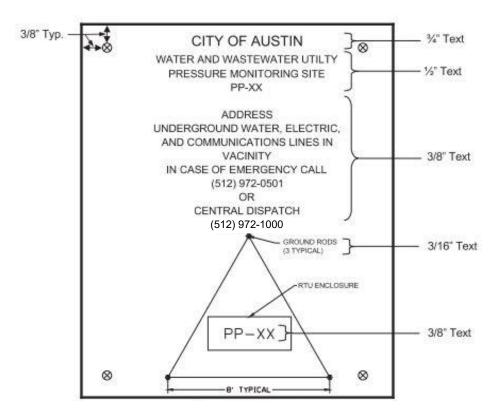
Metal surfaces of panels and enclosures shall be prepared, primed and finish
coated in accordance with the requirements of this specifications and coating
manufacturer's recommendations. Scratches or blemishes in panel faces shall
be filled prior to finishing. One coat of primer shall be applied at the
manufacturer's recommended dry film thickness and allowed to dry prior to
applying the first finish coat.

## C. Miscellaneous

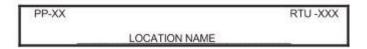
1. All miscellaneous hardware and fittings shall be stainless steel. Stainless steel shall meet or exceed the corrosive-resistant properties of 316 stainless steel.

#### 2.3 NAMEPLATES

- A. Nameplates shall be machine engraved, three ply laminated phenolic nameplates. Nameplates shall be attached to the panel with a minimum of four self-tapping 316 stainless steel sheet metal screws and double-sided adhesive foam tape. The height of each character shall be a minimum of 1/4" except as noted.
- B. Exterior Door Nameplate shall be 11 inches in height, 8 inches wide, black with white lettering, with the height of each character as noted below.
- C. Interior Door Nameplate shall be 2 inches in height, 7½ inches wide, black with white lettering, with the height of each character to be a minimum of ¼ inch, except as noted.
- D. Nameplate engraving shall be as shown below, utilizing the site specific information contained on the Drawings. Nameplates shall be provided for all panels and cabinets shown on the Contract Drawings.



Exterior Door Nameplate



Interior Door Nameplate

## 2.4 WIRING AND ELECTRICAL DEVICES

## A. General

 Provide the wiring and electrical devices specified below and install these and internal panel wiring as shown on the Contract Drawings. All spare RTU input/output points shall be wired to terminal blocks. Provide 10% spare terminals over and above the completely wired RTU I/O points.

## B. Power Distribution

- Unless otherwise specified, power for instrumentation equipment shall be obtained from a 120 volt, 60-hertz distribution panel-board in the Lighting Panel.
- 2. Each cabinet shall be equipped with a 120 VAC main power disconnect circuit breaker and power distribution circuit breakers as shown on the Contract Drawings. The main power disconnect breaker shall be a one pole breaker rated at the amperage shown on the Contract Drawings. Distribution circuit breakers shall be single pole rated at the amperage shown on the Contract Drawings.

- The circuit breaker shall be rated at 240 VAC maximum with a short circuit rating of 10,000 amps for all breaker ratings. The circuit breakers shall be mounted on a standard DIN rail, and shall be Allen-Bradley Channel Mounting Type, or equal.
- 3. For each power distribution circuit breaker, a neutral return terminal block shall be installed at the bottom of the breaker rail. The neutral return terminal block shall be standard DIN rail mounted, and shall be rated to carry required amperes and accept up to two 12 AWG wires. This terminal block shall conform to the requirements specified herein.
- 4. Each cabinet shall be provided with grounding GFCI type receptacle power outlets for 120 VAC power supply connections as shown. Each piece of equipment which is equipped with an AC power cord shall be plugged into a power outlet.

#### C. Panel Connection Wire and Cable

- 1. All cable furnished by the CONTRACTOR, including cable with any and all wires terminated at both ends within the same panel or enclosure and cable with any wires terminated at more than one panel or enclosure, shall conform to the requirements specified below.
  - a. Power and Control Cable: Power and control wiring shall be single conductor stranded copper NFPA 70 Type MTW. Power wiring from the main circuit breaker to distribution breakers shall be 12 AWG minimum. All other single conductor 120 VAC and 24 VDC power and common return wiring, common ground buses and all common logic bus circuits shall be 16 AWG minimum. Circuits protected by 15 Amp circuit breakers shall be 14 AWG minimum. All power wiring shall be rated for 600V and 80 degrees C.
  - b. Single Conductor Wire: All single conductors used for logic, RTU input/output and discrete control circuit wiring shall be No. 18 AWG stranded conductor copper, Belden Type 9918 (0.080-inch O.D.), or equal.
  - c. Multi-conductor Foil-shield Cable (MCF): All multi-conductor cable used for logic, RTU input/output and discrete control circuit wiring shall be No. 18 AWG stranded copper conductors with polyvinyl/chloride jacket. The cable shall be rated for a minimum of 300 volts and 80 degrees C. The cable shall have an overall aluminum/polyester foil shield with drain wire, Alpha XTRA-Guard 1, or equal.
  - d. Analog Signal Cable: Wiring for 4-20 milliampere, 1-5 volt DC signals and other analog signals shall be No. 18 AWG stranded copper twisted pair shielded cable, 80 degrees C rated, UL listed, 0.25 inches maximum outside diameter, with 100 percent coverage aluminum foil mylar-lines shield and No. 22 AWG (minimum) stranded tinned copper drain wire, Houston Wire and Cable, Belden, or equal. Multi-pair analog signal cable shall be individually shielded (with drain wire) No. 18 AWG stranded conductor copper with a 100 percent aluminum/polyester foil shield with drain wire and an outer PVC jacket. The cable is designated MSP on the Contract Drawings. The cable shall be rated for 600V, 80 degrees C (NEC Article 300-3).
  - e. Multi-Individual Conductor (MIC): Multi-individual conductor cables used for logic, RTU input/output and discrete control circuit wiring shall be number

18 AWG stranded copper conductors with polyvinyl/chloride jacket. The cable shall be rated for a minimum of 600V and 80 degrees C. The cable shall be Belden, or equal.

## D. Wire Tagging

- 1. All panel connection wiring shall be tagged at terminations with machine printed slip on type tags. The CONTRACTOR shall show wire/cable tag designations on all wiring diagrams submitted to the OWNER. There shall be a tag placed within two inches of any wiring termination. The tag shall be fixed to the wire to prevent the tag from sliding more than two inches from the terminal as the result of gravity and vibration.
  - a. Power and Control Circuits
    - 1) Control circuit, logic bus and power circuit wires shall be tagged as defined in this paragraph.
      - a) Control Circuits: Each individual connection wire shall be tagged at both ends of the wire with a wire number. The tag shall be placed on the wire within two inches of the terminal to which the wire is terminated. The CONTRACTOR shall assign a unique number for each wire within a panel.
      - b) Power Circuits: All 120 VAC power wires shall be tagged with the designation "120 VAC-" followed by the circuit breaker number shown on the Contract Drawings, then followed by a letter designating whether the wire carries the line (L), neutral (N) or power ground (PG).
        - Positive 24 VDC power circuit and power bus wires shall be tagged with the designation "+24 VDC-" followed by the circuit breaker number shown on the Contract Drawings, and 24 VDC power returns shall be designated with "24 VDC COMMON".

#### 2. Signal Circuits

a. Signal circuit multi-conductor cables shall be tagged at each end with the designation shown on the wiring diagram. Each signal conductor shall be tagged at each end with the designation of the terminal block to which it is connected. Individual conductors in each pair of twisted-pair cable shall have distinctly different colors, such as black and white, black and clear. Shield ground common wires connected between drain wire terminals shall be green and shall be tagged "SG".

## E. Terminal Blocks

1. Unless otherwise shown or specified, terminal blocks shall be captive screw with pressure plate, DIN EN 50035 rail 600-volt rating. Terminal blocks shall be the type specified in the following table, or equal:

Description	Туре	Application
Terminal Block	Telemecanique AB1VV435U or equal	120 VAC Neutral, 24V Power Return, Shield Terminals
Grounding Terminal Block	Telemecanique AB1TP435U or equal	Equipment Grounding
Fused Disconnect Terminal	Telemecanique AB1FUSE435U6X	120 VAC Line, 24 VDC Power
Analog Input Surge Suppressor	Phoenix TT-2-PE-24DC	Analog Input Signal

Diode Bridged	Telemecanique	Diode Logic Circuits
Block	AB1SF435U and AB1SV2	
	or equal	
Diode Bridged	Telemecanique	Logic Circuits
Block	AB1ET435U or equal	
End Clamps	Telemecanique	Each Group of Blocks
·	AB1AB8M35	

## F. Terminal Tags, Covers and Markers

- 1. Each terminal strip shall have a unique identifying alphanumeric code designation at one end and a plastic marking strip running the entire length with a unique number for each terminal. The CONTRACTOR shall assign terminal strip numbers from the number "1" and continuing in ascending cardinal order. The terminal strip designation shall be the letters "TB" followed by the terminal strip number. The strip and terminal point designations shall be machine printed and 1/8 inch high. Terminal blocks carrying 120 VAC power circuits shall be provided with a transparent, hinged cover for personnel protection and accessibility.
- 2. Terminal markers shall be the type specified in the following table, or equal:

Description	Туре	Application
Terminal Block Marker	Weidmuller 424263530	All Terminal Blocks as
		required

## G. Wire Routing

1. Wires shall be routed in slotted plastic wire-ways with snap covers. Wires carrying 120 VAC shall be separated as much as possible from other wires and signal cables, and shall be routed only in ducts shown on the Contract Drawings to be for 120 VAC. If the power wiring has to cross the signal wiring, the crossing shall be as close to a right angle as possible. Ducts shown for 24 VDC shall be used for all other wires and cables. Routing of 120 VAC in combined ducts shall be minimized. Wires and cable shall be routed along the shortest route between termination points, excepting routes which would result in routing 120 VDC and other wires and cables in the same duct. Wires and cables shall have sufficient length to allow slack and to avoid any strain or tension in the wire or cable. Wires and cables shall be placed in the ducts in a straight, neat and organized fashion and shall not be kinked, tangled or twisted together.

#### H. Wire Terminations

- 1. Single wire and cable conductors shall be terminated according to the requirements of the terminal device.
- 2. For captive screw pressure plate type terminals, the insulation shall be removed from the last .25 inches of the conductor. The conductors shall be inserted under the pressure plate to full length of the bare portion of the conductor and the pressure plate tightened without excess force. No more than two conductors shall be installed in a single terminal. All strands of the conductor shall be captured under the pressure plate.
- 3. For screw terminals, appropriately sized forked spade lugs shall be used. Lugs shall be crimp on type that form gas tight connections. All crimping shall be

- done using a calibrated crimping tool made specifically for the tug type and size being crimped.
- 4. On shielded cables, the drain wire shall be covered with insulating tubing along its full bare length between the cable jacket and the terminal lug or terminal pressure plate.

## I. Cabinet Lighting

1. Each panel shall be provided with an internal incandescent or fluorescent light as shown on the Drawings. Lights shall operate from 120 VAC, and shall be wired to power through a door-mounted switch which shall be activated by opening the cabinet door, to be located and wired as shown. Cabinet lights shall be Hoffman LF120V15, with F6T5 Bulb or equal.

## J. Power Line Surge Protectors

- 1. 120/240 volt single phase service entrances and 120 volt control power protection. Use CITEL, Model DS42-120/G.
  - a. Application: 1 phase, 120 Vrms, 2 wire + ground
  - b. Maximum Operating Voltage: 150 Vrms (184 Vpk) L-N, L-G
  - c. Input Power Frequency: 50, 60, Hz
  - d. Peak Surge Current: 40,000 Amperes Total (8/20  $\mu$ s Waveform, Single Impulse) 20,000 Amperes Per Phase Nominal (15 x 8/20  $\mu$ s)
  - e. Energy: 1,050 Joules Total (10 X 1000 s Waveform, Single Impulse); 420 Joules Per Phase; 210 Joules N-G
  - f. Response Time: Common Mode (N-G, L-G) Differential Mode
  - g. Design: Suppresser to be fully encapsulated in thermally conductive material and shall consist of custom parallel circuitry.
  - h. Listing/Certification: The entire unit shall bear UL 1449, C-UL listing and CSA certification. Listing of modules, sub-assemblies or components is not acceptable.
  - i. Warranty: 10 years
  - j. Size: Din Rail mountable, .71"W x 3.54"H x 2.63"D.

#### K. Panel Ground

- 1. Each panel shall be provided with a 1 inch high x 0.25-inch thick solid copper grounding bus bar as shown on the Drawings. The grounding bar shall be mounted on insulated standoffs so that no electrical connection is made between the grounding bar and the cabinet through the mounting. The ground bar shall be drilled and tapped for a .25-20 screws at .5 inch intervals along its entire length.
- 2. An uninsulated solid copper #8 AWG ground wire shall be attached between the ground bar and the panel enclosure, and between the ground bar and the mounting panel. The ground connection to the enclosure and panel shall be made by sanding the paint finish off a small area, drilling a hole for a .25 inch bolt and mounting a .25-20 bolt to the panel to serve as a grounding stud. The grounding stud shall be attached with a nut and flat washers on both sides of the enclosure/panel, and with an inside tooth star lock washer next to the panel surface. The star lock washer shall be on the inside surface of the enclosure, and the front surface of the mounting panel. The grounding wire shall be secured to the stud with a nut and inside tooth star lock washer. These

grounding points shall be located within 12 inches of the bottom of the grounding bar.

## L. Power Supply

1. Each panel shall be provided with a 24 VDC power supply as shown on the Contract Drawings. These power supplies shall operate from 120 VDC input power and shall provide direct current output current of 5 Amperes (minimum) at 24 VDC at 40 degrees C, and shall be adjustable from 24 to 28.8 VDC by screw driver operated adjustment. Input power regulation shall be 85 to 132Vac. Output load regulation shall be 1 to 3% Ripple shall not exceed 200mV at full load. The power supplies shall have integral output current limiting and overvoltage protection. The power supplies shall have fully enclosing cases.

## M. Wiring Duct

1. Plastic wiring duct shall be slotted type with dust cover, Panduit Type E or NE, as required.

## N. Internal Temperature Monitoring (RTD)

- 1. A temperature sensor shall be installed in the panel for the controller to monitor the internal temperature of the enclosure.
- 2. Sensor Type: RTD
- 3. Sensor Signal Output: 4-20mA
- 4. Manufacturer: Omega PR1321001/46E Probe with SPRTX-S1 Transmitter

#### PART 3 **EXECUTION**

#### 3.1 TEST REQUIREMENTS

#### A. Shop Testing

- 1. The CONTRACTOR shall shop test the panels and correct any defects discovered prior to delivery. These tests shall consist of the following:
  - a. The CONTRACTOR shall verify that each wiring connection is made properly by checking electrical continuity, assuring that connections have less than one Ohm resistance end to end, and that no cross continuity exists between separate circuits.
  - b. The CONTRACTOR shall conduct a test of all power circuits and power supply equipment to verify that proper voltages are delivered and all power supply equipment is operating according to the manufacturer's specifications. These tests shall be witnessed by the OWNER's representative. The CONTRACTOR shall certify the results in writing to the OWNER.
  - c. The CONTRACTOR shall functionally test each electrical device specified in Part 2 above to verify correct operation. The CONTRACTOR shall also test each input/output point. Inputs shall be exercised at the location in the panel the greatest distance in the circuit from the RTU chassis and verified through to the RTU processor. Results shall be demonstrated on a programming terminal. Each output shall be exercised from a programming terminal and verified through to the panel location the greatest distance in the circuit from the RTU chassis. At a minimum, analog inputs and outputs shall be tested at 0%, 25%, 50%, 75%, and 100% of range. This test shall

# PANELS AND ENCLOSURES SECTION 17410

- be witnessed by the OWNER's representative and the CONTRACTOR shall certify the results in writing to the OWNER. Test the operator interface unit, including simulated alarm conditions.
- d. The CONTRACTOR shall test Ground Fault Interrupter (GFI) receptacles and circuit breakers for proper operation by methods sanctioned by the receptacle manufacturer.

## 3.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

#### **END OF SECTION**

- 1) D. Widner
- 2) R. Copeland

#### PART 1 GENERAL

#### 1.1 SUMMARY OF REQUIREMENTS

#### A. Scope

- The CONTRACTOR shall provide and install RTU for the location identified in the drawings.
- The CONTRACTOR shall be responsible for providing a complete and operational system.
   This shall include all RTU equipment, cables, connectors, prewired termination blocks, radio communications system, 120VAC 60 Hz power feed, field interconnect wiring and conduit for RTU input/output circuits as defined on the drawings, etc.

## B. RTU Types

- 1. Pressure Point RTU
  - a. The Pressure Point RTU is designed to monitor distribution system pressure at field locations throughout the system. The RTU is designed to allow field instrumentation to be installed inside the enclosure, and utilizes a NEMA 3R enclosure for outdoor mounting.
  - b. The Pressure Point RTU is based on a Schneider Electric Modicon M340 PLC.

#### PART 2 PRODUCTS

#### 2.1 GENERAL REQUIREMENTS

A. The RTU shall be PLC based with interfaced telemetry communications and PLC interfaced to local input/outputs (I/O's), provide local data storage, operate from normal AC power and battery backup power, and provide remote communication to the Owner's existing SCADA system located at the South Service Center. The RTU shall be addressable from the SCADA system for remote monitoring and/or control of the location where the RTU is installed.

## 2.2 RTU DESIGN REQUIREMENTS

- A. The RTU shall be designed to interface the parameters shown on the specifications and drawings.
- B. The RTU shall be designed around a microprocessor-based subsystem comprised of a programmable logic controller (PLC) as specified herein with appropriate accessories and appurtenances as designated herein. Typical accessories and appurtenances shall include: PLC, DC power supply, uninterruptible power supply, radio communications, power conditioning/surge protection and related I/O modules and wiring terminations as designated per the design DRAWINGS.

#### 2.3 RTU COMMUNICATIONS

A. The RTU shall remote communicate to the SCADA system via a licensed MAS radio system. Specification section 17320 provides the requirements for the communications system. Provision for Ethernet based communications will be provided for all RTUs.

#### 2.4 PRESSURE POINT RTU

- A. The Pressure Point RTU shall be a Control Panels USA part number PPRTU-1000-0-0 or Prime Controls part number 176000-PP-RTU, no equal.
- B. The point of contact for the procurement of the Pressure Point RTU is John McClanahan of Control Panels USA at (512) 863-3224 or Alfonso Garza of Prime Controls at (512) 550-5892.

Ver. 08/13/12 17420 By AW

## 2.5 RTU CONFIGURATION

A. Communication port to be set for 9600 baud, No parity, 8 data bits, and 1 stop bits, or if required, even parity 7 data bits and 1 stop bit.

#### 2.6 SYSTEM COMPONENTS AND WIRING

- A. The RTU layout and wiring shall be in accordance with the manufacturer's recommended wiring practices and requirements.
- B. All wiring shall be wire tagged and labeled; all components shall be name tagged and labeled; all wire tags and labels shall match the names on the RECORD schematic drawings.
- C. Specification Section 17410 provides requirements for wiring and termination in the RTU panels.

#### 2.7 RTU PROGRAMMING

A. Application RTU programming shall be by the City or Engineer. Application programming will only be done upon certification of a functional PLC based RTU system, including remote communications.

#### PART 3 EXECUTION

#### 3.1 CONFIGURATION SYSTEM REQUIREMENTS

- A. RTU's configuration/establishment of communications with host (at Factory)
- B. OaSys Configuration (by City or Engineer)
  - 1. Add REMOTE record for communication to the RTU.
  - 2. Add associated STATUS and ANALOG points to the OaSys data tables.
  - 3. Add database points to the COLLECT table.
  - 4. Add the pressure points to the "Pressure Points List".
  - 5. Add the Pressure Point Location to the correct Overview Map.
  - 6. Add the Pressure Point to the correct Pressure Zone Diagrams (worst case=2)
  - 7. Distribute to limited stations to support testing.
- C. Factory Testing: Testing at factory utilizing radio based communications and remote dial-in capability of OaSys.
- D. Field Testing:
  - 1. Configuration confirmation, establishment of radio communications to host master.
  - 2. Support CONTRACTOR test of installed RTU, either from field or SSC.
- E. Distribute modified graphic files to all XOS system nodes. (by City or Engineer)

#### 3.2 TEST REQUIREMENTS

- A. Factory Demonstration Test
  - The RTUs shall be demonstrated as part of a Factory Demonstration Test (FDT). In addition to the general system test requirements, each RTU shall be subjected to the tests described in this section with a written confirmation of the test results. The Owner or Engineer may choose to witness the FDT.
  - 2. Certified factory test shall include but not be limited to:
    - a. PLC process functions--diagnostics, run, load program.
    - b. PLC I/O modules functions all channels, all I/O types
    - c. RTU operation on backup power supply

d. RTU telemetry performance – communications via radio communications.

## B. Temperature Certification

1. The RTU Supplier shall provide certification that the RTU meets the ambient temperature requirements as specified and have been tested to screen for infantile failures.

#### C. RTU Functional Test

- 1. Each RTU shall successfully pass the following functional tests to be performed in conjunction with the system Factory Demonstration Test:
  - a. A close and open operation on each control point, showing proper sequence of operations.
  - b. Verify the proper operation of the digital outputs.
  - c. A series of communications tests showing all message protocols and formats to which the equipment is designed to respond, and demonstrating that all error- detection or errorcorrection capabilities function properly, and that the equipment does not respond to erroneous commands.
  - d. Telemeter readings of selected analog points to verify that the readings are within the specified accuracy when the inputs are at 0, 25, 50, 75 and 100 percent of full- scale.
  - e. A test showing that as a result of a scan request from the HMI, all requested analog, indication, and alarm points are transmitted from the PLC.
  - f. A test showing that the PLC successfully performs its various modes of operation while the power source for the PLC is varied over its specified range.
  - g. A test verifying that all common equipment, wiring, files, and power supplies are provided for expansion of the PLC to the ultimate point count specified. This test shall also verify that the power supplies are capable of carrying the increased load for this expanded point count.
  - h. A test to verify the proper operation of the stand alone capabilities of the PLCs. This shall include configuration of the loops or downloading from the HMI and testing the actual control strategy with test signals.

#### 3.3 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

#### **END OF SECTION**

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#### PART 1 GENERAL

#### 1.1 MATERIALS AND QUALITY

#### A. General

1. Material shall be new, free from defects, and of the quality specified. All instruments with the same specification shall be from the same manufacture.

## B. Electronic Equipment

1. Electronic equipment shall be solid-state construction, utilizing semiconductors unless otherwise specified. Printed or etched circuit boards shall be glass epoxy of sufficient thickness to prevent warping. Alignment and adjustments shall be noncritical, stable with temperature changes or aging and accomplished with premium grade potentiometers. Components of standard electronic assemblies shall not be replaced with components of different characteristics in order to meet the performance requirements of this specification. Parts shall be as shown in the instruction manuals and shall be replaceable with standard commercial components of the same description without degrading the performance of the completed assembly.

#### C. UL Label

Enclosures shall be UL labeled. All other devices specified in this section shall be UL listed.
This requirement shall be waived only if a UL listing is not available from any manufacture
of a similar product which meets all other specified requirements, or if the product specified
is not UL listed.

#### PART 2 PRODUCTS

### 2.1 INSTRUMENTATION

#### A. General

1. Instruments and equipment shall be installed as specified on the drawings such that ports and adjustments are accessible for in-place testing and calibration. Instrumentation equipment shall be mounted for unobstructed access, but mounting shall not obstruct walkways. Where appropriate, use quick disconnect pressure taps for calibration with appropriate isolation valves. Instruments shall be located as close as possible to their associated equipment. Instruments shall not be mounted where shock or vibration will impair their operation.

#### B. Pressure Indicator/Transmitter

- The indicator/transmitter shall sense, indicate and transmit the water pressure at various points in the City's Water Distribution System. The transmitter shall convert the measured pressure to a 4-20mA DC electrical output that is linear with the pressure of the discharge header (pipe). The transmitter, tubing, valves and associated components, as detailed on the drawings, shall be installed as shown on the drawings.
- Accuracy of the indicator/transmitter shall be 0.2% of calibrated span, and repeatability shall be 0.2% of span. The transmitter shall meet the specified performance under ambient temperature range of -40 degrees F to + 185 degrees F, process temperature limits of -50 degrees F to +250 degrees F, DC loop supply voltage range of 12 to 42 VDC, and output load of 200 to 1,450 ohms.
- 3. The transmitter shall be equipped with local indicator (integral to transmitter) which is calibrated in "pounds per square inches" and to the range of the transmitter. The indicator shall be of the digital type with liquid crystal display (LCD), driven by the loop power (4-20mA at 24 VDC), and have an accuracy within 0.2% of full scale.
- 4. The indicator/transmitter to have NEMA-4X watertight and corrosion resistant enclosure. All wetted parts, including the diaphragm which protects the sensor, are to be ANSI type 316 stainless steel (316).

- 5. The transmitter shall be equipped with operators on the face of the unit for configuration and calibration functions. External and/or internal source/devices shall not be required for calibration; additionally handheld programmer shall not be required for unit configuration and calibration functions.
- 6. Acceptable manufacturer for the pressure measuring indicator/transmitter is "Foxboro series IGP10-G" with specified accessories, or approved equal, calibrated to 0-150 psig.

## C. Tubing, Hand Valves and Fittings

- 1. Valves where applicable, shall be full port ball valves with 316 stainless steel trim and body and with Teflon seats and packing. Three-way switching shall be as specified. Valves shall be Parker CPI, Whitey, Hoke, or equal.
- 2. Thermoplastic fittings shall be nylon with nitride "O" ring and stainless steel grab ring fittings shall be Parker "Fast and Tite", or equal.
- 3. Metal fittings shall be type 316 stainless steel. Fittings shall be of the swage ferrule design. Flare or ball sleeve compression type are not acceptable. Fittings shall be Crawford "Swagelok", Parker "CPI", Hoke "Gyrolok", or equal. Sizes to be as shown on the drawings.

#### D. Signal Tubing

1. Unless otherwise shown, metal tubing shall be 316 stainless steel. Outside diameter of stainless steel tubing shall be as shown on, and required by the drawings. Tubing shall be rated 850 psig at 75 degrees F.

#### PART 3 EXECUTION

3.1 REFER TO SECTION 17000.

#### 3.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this Section, but shall be included in the unit price bid under section Special Provision SP1617.

## **END OF SECTION**

- 1) D. Widner
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# Section 17900 - Instrument List

Database Tag	Description	Instrument Tag	Range
PN_PP31_DS_PIT_1_HI	Hwy 290/Springdale Rd North Pressure	PN-PP31-PIT-001-I	0-150 psig
PN_PP31_DS_PIT_2_HI	Hwy 290/Springdale Rd North Reduced	PN-PP31-PIT-002-I	0-150 psig
	Pressure		
PN_PP31_DS_PIT_3_HI	Hwy 290/Springdale Rd Central North Pressure	PN-PP31-PIT-003-I	0-150 psig